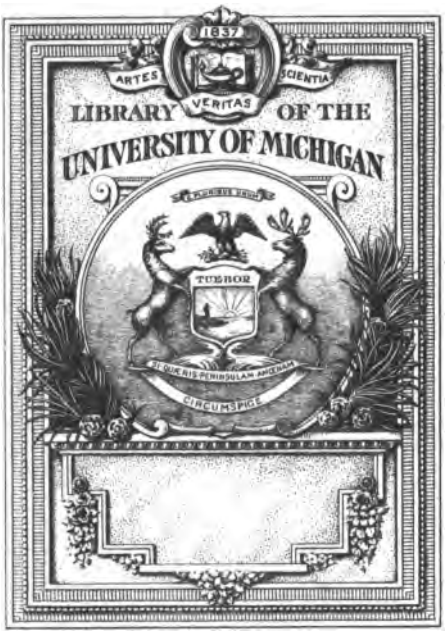
COLOR STANDARDS AND NOMENCLATURE

RIDGWAY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EXPLANATION OF PLATES XXII AND XXIV.

Reference to these plates was unfortunately overlooked when the text was going through the press.

These plates are simply *extras*. They were made at an early stage in the preparation of the work and discarded; but were finally inserted, merely to add to the number of colors represented.

COLOR STANDARDS

AND

COLOR NOMENCLATURE

BY

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With Fifty-three Colored Plates

and

Eleven Hundred and Fifteen Named Colors.

WASHINGTON, D. C.

1912.

Published by the Author.

PRESS OF
A. HOEN & COMPANY
BALTIMORE, MD

TO

Señor Don JOSÉ C. ZELEDÓN

OF

SAN JOSÉ, COSTA RICA

True and steadfast friend for more than two-score years; host, guide, and companion on excursions among the glorious forests, magnificent mountains, and lovely plains of his native land; whose encouragement made possible the completion of a seemingly hopeless task, this book is affectionately and gratefully dedicated.

PREFACE

THE motive of this work is THE STANDARDIZATION OF COLORS AND COLOR NAMES.

The terminology of Science, the Arts, and various Industries has been a most important factor in the development of their present high efficiency. Measurements, weights, mathematical and chemical formulæ, and terms which clearly designate practically every variation of form and structure have long been standardized; but the nomenclature of colors remains vague and, for practical purposes, meaningless, thereby seriously impeding progress in almost every branch of industry and research.

Many works on the subject of color have been published, but most of them are purely technical, and pertain to the physics of color, the painter's needs, or to some particular art or industry alone, or in other ways are unsuited for the use of the zoologist, the botanist, the pathologist, or the mineralogist; and the comparatively few works on color intended specially for naturalists have all failed to meet the requirements, either because of an insufficient number of color samples, lack of names or other means of easy identification or designation, or faulty selection and classification of the colors chosen for illustration. More than twenty years ago the author of the present work attempted to supply the deficiency by the publication of a book* containing 186 samples of named

*A | Nomenclature of Colors | for Naturalists, | and | Compendium of Useful Knowledge | for Ornithologists. | By | Robert Ridgway, | Curator, Department of Birds, United States National Museum. | With ten colored plates and seven plates | of outline illustrations. | Boston: | Little, Brown, and Company. | 1886. | (12mo., pp. 129, pls. 17.)

The subject of color and color nomenclature discussed on pages 15-58. Plates i-x, inclusive, represent 186 named colors, hand-painted (stencilled).

colors, but the effort was successful only to the extent that it was an improvement on its predecessors; and, although still the standard of color nomenclature among zoologists and many other naturalists, it nevertheless is seriously defective in the altogether inadequate number of colors represented, and in their unscientific arrangement. Fully realizing his failure, the author, some two or three years later, began to devise plans, gather materials, and acquire special knowledge of the subject, in the hope that he might some day be able to prepare a new work which would fully meet the needs of all who have use for it. Unfortunately, his time has been so fully occupied with other matters that progress has necessarily been slow; but after more than twenty years of sporadic effort it has at last been completed.

Acknowledgments are due to so many friends for helpful suggestions that it is hardly possible to name them all, or to specify the extent or kind of help which each has rendered; but special mention should be made of Mr. LEWIS E. JEWELL, of Johns Hopkins University; Dr. R. M. STRONG, of the University of Chicago; Prof. W. J. SPILLMAN, of the U. S. Department of Agriculture; Mr. WILLIAMS WELCH, of the U. S. Signal Service; Mr. MILTON BRADLEY, of Springfield, Mass.; Dr. P. G. NUTTING, of the U. S. Bureau of Standards; Mr. P. L. RICKER, of the Bureau of Plant Industry, U. S. Department of Agriculture; and Mr. J. L. RIDGWAY, of the U. S. Geological Survey. The late Professor S. P. LANGLEY, then Secretary of the Smithsonian Institution, was good enough to take a kindly interest in this undertaking and gave the author assistance for which he is glad to make acknowledgment. More than to all others, however, is the author deeply indebted to Mr. JOHN E. THAYER, of Lancaster, Mass., and Señor Don José C. ZELEDÓN, of San José, Costa Rica, for aid so indispensible that without it the work could not have been completed.

To Dr. G. GRÜBLER & Co., of Leipzig, Germany, the author is under obligations for the gift of a nearly complete set of their celebrated coal-tar dyes, which have proven quite necessary to the work, especially in the coloring of the Maxwell disks on which the color scheme is based.

The reproduction of the plates has been a difficult matter, involving not only expensive experimentation, but more than three

years of unremitting labor. Vastly different from the ordinary lines of commercial color work, the correct copying of each one of the 1115 colors of the original plates developed many perplexing and often discouraging problems, which were finally solved through Mr. A. B. HOERN'S expert knowledge of chemistry and pigments; the skill, industry, and patience of the firm's head colorist, Mr. FRANK PORTUGAL, and the personal interest of both these gentlemen. It is, therefore, with the greatest pleasure that the author's grateful acknowledgment is made to the firm of A. HOERN & COMPANY for the satisfactory manner in which they have fulfilled their contract.

CONTENTS

PROLOGUE

As stated in the Preface, the purpose of this work is the standardization of colors and color nomenclature, so that naturalists or others who may have occasion to write or speak of colors may do so with the certainty that there need be no question as to what particular tint, shade, or degree of grayness, of any color or hue is meant. Therefore, it is unnecessary to treat of the subject from any other point of view; it will be sufficient to say that this work is based on a thorough study of the subject from every standpoint, and that practically all authoritative works on the subject of color have been carefully consulted.*

PLAN.—The scientific arrangement of colors in this work is based essentially on the suggestions of Professor J. H. Pillsbury for a scheme of color standards,† which have also been the basis of several other efforts toward the same end, as the plates in Milton Bradley's "Elementary Color" and educational colored papers, Prang's charts of standard colors, Klinkseick and Valette's "Code des Couleurs," etc.; but while all these present a scientifically arranged color-scheme and more or less adequate

*Titles of several books on the subject which are especially recommended to the lay student of chromatology are given at the end of this text.

†See *Science*, June 9, 1893, and *Nature*, Vol. LII, No. 1347, Aug. 22, 1895, pp. 390-392.

number of colors they all fail to supply a ready or convenient means of identifying and designating the colors—the principal utility of a work of this kind. It is in the latter respect that the present work is believed to meet, more nearly than any other at least, this essential requirement, and in this consists whatever originality may be claimed for it.

The "key" to the classification or arrangement herewith presented is, of course, the solar spectrum, with its six fundamental colors and intermediate hues, augmented by the series of hues connecting violet with red, which the spectrum fails to show. If, with the red-violets and violet-reds thus added to the spectrum hues, the band forming this scale be joined end to end a circle is formed in which there is continuously a gradual change of hue, step by step, from red through orange-red and red-orange to orange; orange through yellow-orange and orange-yellow to yellow; yellow through green-yellow and yellow-green to green; green through blue-green and green-blue to blue; blue through violet-blue and blue-violet to violet; and violet through red-violet and violet-red to red—the starting-point—with intermediate connecting hues. In the solar spectrum, both prismatic and grating, but especially the former, the spaces between the adjoining distinct colors are very unequal; therefore for the present purpose an ideal scale must be constructed, so that an approximately equal number of equally distinct connecting hues shall be shown. Distinctions of hue appreciable to the normal eye are so very numerous* that the criterion of convenience or practicability must determine the number of segments into which the ideal chromatic scale or circle may be divided in order to best serve the purpose in view. Careful experiment seems to have

*According to Aubert more than 1000 hues are distinguishable in the spectrum, though among them all the hues betweeen violet and red are wanting.

demonstrated that thirty-six is the practicable limit, and accordingly that number has been adopted.* If the number of intermediate hues were equal in all cases there would, in this scheme, be five between each two adjacent fundamental colors of the spectrum; but a greater number of recognizably distinct hues is obviously necessary in some cases than in others; for example, spectrum orange is decidedly nearer in hue to red than to yellow, and therefore the number of intermediates required on each side of the orange is different, being in the proportion of four for the red-orange series to five for the orange-yellow, and similarly six are required for the violet-red series, while four suffice for the blue-violet hues.

There is no known means by which we can measure the proportion of two or more *pigments* in any given mixture, "because color-effect cannot be measured by the pint of mixed paint or the ounce of dry pigment;"† but, fortunately, we have a very exact method, in the color-wheel and Maxwell disks, by which the relative proportions of two or more *colors* in any mixture may be precisely measured. This method has been used in the painting of every one of the 1115 colors of the present work, by means of one disk to represent each one of the thirty-six colors (both pure and "broken"), together with a black, a white, and a neutral gray disk, the last being a match in color to the gray resulting from the mixture of red, green and violet on the color-wheel;‡ the neutral gray disk, however, being used only for the making of disks for the broken series of colors (′, ″, ‴, ⁗, and ⁗′) and for the scale of neutral grays (Plate

*That is to say, the practical limit for pictorial representation of the colors in their various modifications.

†Milton Bradley: Elementary Color, p. 18.

‡See colored figure on frontispiece.

LIII.) These colored disks are slit on one side from center to circumference, and therefore by interlocking two or more they may be adjusted so that either occupies any desired percentage of the whole area, which may be very precisely determined by a scale of 100 segments shown on the outer edge of a larger disk on which the colored disks are superimposed. When connected with the color-wheel and adjusted as may be desired, and then rapidly revolved, the two or more distinct colors resolve themselves into a single uniform composite color, whose elements are shown, in their relative proportion, by the scale surrounding the disks.*

The scales (both horizontal and vertical) of the present work are all prepared directly from definite color-wheel formulæ, based on carefully calculated curves; the thirty-six pure spectrum hues, represented

*See the colored figure on the frontispiece of this work, which clearly illustrates this method of color measurement. Larger disks of spectrum red, green, and violet are interlocked and adjusted so that they present, respectively, 32, 42, and 26 per cent. of the circumference; superimposed on these is a single smaller disk of neutral gray, and on this two still smaller disks of black and white, the former occupying 79, the latter 21, per cent. of the area. The result of this combination of colors, when the disks are rapidly revolved, is that the entire surface becomes a uniform neutral gray precisely like the middle disk, which blends so completely with the color inside and outside its limits that no trace of division can be detected. Hence, neutral gray equals a combination of red 32, green 42, and violet 26 per cent., and also equals a combination of black 79 and white 21 per cent. As further illustrating the point, it may be mentioned that not only does the above-mentioned combination of the three primary colors equal neutral gray but so also does the combination of any color ("secondary" or "tertiary" as well as primary) with its complementary, though the darkness or lightness of the gray varies somewhat, as the following table shows:

SPECTRUM COLOR.		COMPLEMENTARY COLOR.		EQUIVALENT GRAY.	
Name.	Per Cent.	Per Cent.	Composition.	Black.	White.
Red	44	56	Blue 41 + Green 59.	72.5	27.5
Orange	28.5	71.5	Blue 51.5 + Green 48.5.	69	31
Yellow	33	67	Blue 60.5 + Violet 39.5.	64	36
Green	51	49	Red 57.5 + Violet 42.5.	73	27
Blue	64	36	Yellow 82 + Orange 18.	62	37
Violet	62.5	37.5	Yellow 69 + Green 31.	61.5	38.5

by the middle horizontal line of color-squares on Plates I-XII (together with an equal number of intermediates represented by blank spaces), requiring a separate curve and consequently different relative proportions of the two component colors for each series of hues—that is, the series from red to orange, orange to yellow, yellow to green, green to blue, blue to violet, and violet to red, respectively; but the progressive increments of white in the scales of tints, black in those of shades, and neutral gray in the several series of broken colors are exactly the same in every case. The first series of Plates (I-XII) shows the pure, full spectrum colors and intermediate hues (middle horizontal line, nos. 1-72),* each with its vertical scale of tints (upward, *a-g*) and shades (downward, *h-n*), the increments of white for the tints being 9.5, 22.5, and 45 per cent., respectively, those of black in the shades being 45, 70.5, and 87.5 per cent. The remaining Plates show these same thirty-six colors or hues in exactly the same order and similarly modified (vertically) by precisely the same progressive increments of white (upward) and black (downward), but all the colors are dulled by admixture of neutral gray; the first series (1′-72′, Plates XIII–XXVI) containing 32 per cent. of neutral gray, the second (1″-72″, Plates XXVII–XXXVIII) 58 per cent., the third (1‴-72‴, Plates XXXIX–XLIV) 77 per cent., and the fourth (1⁗-72⁗, Plates XLV–L) 90 per cent. The last three Plates (LI-LIII) show the six spectrum colors† (also purple, the intermediate between violet and red) still further dulled by admixture of 95.5 per cent. of neutral

*The number is doubled so that every other one represents an intermediate hue not shown in color.

†Owing to the circumstance that spectrum orange does not, at least when mixed with gray, fairly represent a medium hue between red and orange, being much nearer the former, a hue much near to yellow (yellow-orange, No. 15) has been selected.

gray, these being in reality colored grays; to which are added a scale of neutral gray and one of carbon gray, the former being the gray resulting from mixture of the three primary colors (red 32, green 42, violet 26 per cent., which in relative darkness equals black 79.5, white 20.5 per cent.); the latter being the gray produced by mixture of lamp black and Chinese white, and the scale a reproduction of that in the author's first "Nomenclature of Colors" (1886, Plate II, nos. 2-10). It should be emphasized that in all cases except the scale of carbon grays, only the disks representing the middle horizontal series of colors (both pure and broken) have been used, in combination with a black and a white disk, respectively, to make the colors of the vertical scales of tints and shades.

The coloring of a satisfactory set of disks to represent the thirty-six pure spectrum colors and hues was a matter of extreme difficulty, many hundreds having been painted and discarded before the desired result was achieved. Several serious problems were involved, the matter of change of hue through chemical reaction of the combined pigments or dyes* (especially the latter) being almost as troublesome as that of securing the proper degree of difference between each adjoining pair of hues. The method by which satisfactory results were finally secured was as follows: First, six disks were colored to represent each of the fundamental spectrum colors,

*For satisfactory color-wheel work it is necessary to discard practically all the so-called artists' colors, as being much too dull to even approximately represent the colors of the spectrum, and to substitute carefully selected aniline or coal-tar dyes, of which, fortunately, there is a very large number of remarkable purity of hue. Indeed, the work of most color-physicists is vitiated by their use of such crude colors as vermilion, carmine, scarlet-lake, chrome yellow, emerald green, Prussian blue, etc. (For a list of dyes and pigments used in preparing the Maxwell disks representing the thirty-six colors of the chromatic scale, see pages 26, 27.)

according to the author's conception of them.* These six disks were then placed against a suitable background (a neutral gray), in spectrum sequence, with wide intervals for the accommodation of connecting series of disks, which were then colored so as to represent an apparently even transition from one to the other. When this very difficult task had been done as well as the eye alone could judge, each intermediate was then measured on the color-wheel and the relative proportions (in percentages) of its two component colors recorded. After this had been done for all the intermedite hues each series (the red-orange, orange-yellow, yellow-green, green-blue, blue-violet, and violet-red) was taken separately and a curve constructed on cross-section paper from the recorded ratios. These curves were found to be in all cases more or less irregular or unsymmetrical, but nevertheless were sufficiently near correct to serve as a basis for a symmetrical curve; and after the points out of

*In fixing the exact position or wave-length of the spectrum colors considerable latitude is allowable, the element of "personal equation"—that is, difference in the conception of different persons as to just where the reddest red, greenest green, etc., are located, accounting for the considerable disagreement among chromatologists as to the wave-lengths. The following table, showing the average, mean, and extreme wave-length of each of the spectrum colors as given by nine or more authorities together with those of the present work (as determined by Dr. P. G. Nutting, Associate Physicist of the U. S. Bureau of Standards) is of interest in this connection:

	This work.	Average of 9-12 authorities.	Extremes of 9-12 authorities.	Mean of 9-12 authorities.
Red	644	6770	6440-7028	6734 (10)
Orange	598 ± 2	6074	5892-6300	6096 (9)
Yellow	577 ± 1	5786	5640-5850	5745 (10)
Green	520 ± 10	5235	5050-5335	5193 (11)
Blue	473 ± 3	4738	4520-4861	4680 (12)
Violet	410	4176	4050-4330	4190 (10)

From this table it will be seen that the red of this work is appreciably more orange than that of others, the orange slightly more yellowish, and the violet a little less bluish than the average; but the author is assured by Dr. Nutting that these standards are exceptionally accurate.

proper line were suitably relocated the two component colors were correspondingly readjusted on the color-wheel and each faulty disk corrected (or a new one painted) until it exactly matched the required combination. The scales representing the tints and shades of each color, and also the gray or broken colors were similarly determined by corrected curves.*

By the method adopted of running each of the thirty-six spectrum hues through a scale of tints and shades, and repeating the combination through several series modified by increasing increments of neutral gray, practically the entire possible range of color variation is covered,† rendering it an easy matter to locate in the plates, either among the colors actually shown or in an intermediate space, any color which it is desired to match; and where short distinctive names have not been found (their place being, tentatively, supplied by compound names), as, necessarily, must often be the case, any color or intermediate between any two colors, either as to hue, tint, or shade, may be readily designated by the very simple system of symbols (numerals and letters) employed.‡

In order to designate any color for which a satisfactory name cannot be found, or one not represented on the plates, it is only necessary to proceed as follows: Suppose the color in question is nearest 1 on Plate I; say, for example, is intermediate in hue between 1 (spectrum red) and 3 (scarlet-red), or in other words if represented in color its position would be in the uncol-

*The percentages are given in tables on pages 23 and 25.

†That is to say, theoretically. Unfortunately it seems to be beyond the colorists' skill to reproduce true shades of the pure colors, all showing a more or less decided admixture of gray, resulting in a series of broken or dull shades. (See pages 23 and 24.)

‡Although only 1115 different colors are actually shown on the plates the system is really equivalent to the presentation of considerably more than 4000 distinguishable and designatable colors.

ored space designated as no. 2; and in tone between the full color (middle horizontal line) and tint *b*. Its designation, therefore, is *2a*. Exactly the same method applies to any of the other blank spaces, as well as to the colors themselves, except that in case of the broken colors the "primes" (′, ″, ‴, ⁗, or ⁗′) are to be affixed to the hue number. First locate the *hue*, designated by number, then the *tone*, designated by lower case letter, the full, pure colors of the middle horizontal row being designated by number alone.

COLOR NAMES.—While it is true that the naming of colors as usually employed has so little to do with the purely technical aspects of chromatology or color-physics that, as Von Bezold remarks* "we are in reality dealing with the peculiarities of language," it is equally true that a collection of color standards designed expressly for the purpose of identifying and designating particular colors can best attain this object by the use of a carefully selected nomenclature. In other words, the prime necessity is to standardize both colors and color names, by elimination of the element of "personal equation" in the matter. In no other way can agreement be reached as to the distinction between "violet" and "purple," two color names quite generally used interchangeably or synonymously but in reality belonging to quite distinct hues, or that any other color name can be definitely fixed. Various methods of handling the matter of color in zoological and botanical descriptions, etc., by the avoidance of color names and substitution therefor of symbols, numerals, or mechanical contrivances (as color-wheel and spectrum analyses, color-spheres, etc.) have been devised but all have been found impracticable or unsatisfactory. The author has taken the trouble to get an expression of opinion in this matter from many

*The Theory of Color (American edition, 1876), p. 99.

naturalists and others, and the preference for color-names very greatly predominates; consequently, whenever it has been possible to find a name which seems suitable for any color in this work it has been done, leaving as few as possible unnamed, and for these some other means must be devised for their designation. (See page 8). The selection of appropriate names for the colors depicted on the Plates has been in some cases a matter of considerable difficulty. With regard to certain ones it may appear that the names adopted are not entirely satisfactory; but, to forestall such criticism, it may be explained that the purpose of these Plates is not to show the color of the particular objects or substances which the names suggest, but to provide appropriate, or at least approximately appropriate, names for the colors which it has seemed desirable to represent. In other words, certain colors are selected for illustration, for which names must be provided; and when names that are exclusively pertinent or otherwise entirely satisfactory are not at hand, they must be looked up or invented. It should also be borne in mind that almost any object or substance varies more or less in color; and that therefore if the "orange," "lemon," "chestnut" or "lilac" of the Plates does not exactly match in color the particular orange, lemon, chestnut or lilac which one may compare it with, it may (in fact does) correspond with other specimens. Without standardization, even if arbitrary, color nomenclature must, necessarily, remain in its present condition of absolute chaos. Even the standard pigments are not constant in color, practically every one of them being subject to more or less variation in hue or tone, different samples from the same manufacturer sometimes varying to the extent of several tones or hues of the present work; indeed, in every case where two or more samples of the same color have been com-

pared it has been found that no two are exactly alike, the difference often being very great. For example: Of five samples of "vandyke brown" only two are approximately similar, each of the other three being widely different, not only from one another but from the other two, one being a blackish brown, another reddish brown, the third a yellowish orange-brown. Of eleven samples of "olive" no two are closely similar, the color ranging from a shade of dull (grayish) blue-green to orange-brown, dark brownish gray, and light yellowish olive; and the same or nearly the same degree of variation is seen in absolutely every color examined, showing very clearly the utter worthlessness of color names unless fixed or standardized.

In order to obtain as many color names as possible for standardization it has been necessary to draw from all available sources. Several thousand samples of named colors have therefore been collected, and for convenience of reference and comparison gummed to card catalogue cards, with the name, source, and other data thereon. These include the colors from many standard works, among them Werner's "Nomenclature of Colours" (Syme's edition, 1821), Hay's "Nomenclature of Colours" (1846), Ridgway's "Nomenclature of Colors" (1886), Saccardo's "Chromataxia" (1891), Mathews' "Chart of Correct Colors of Flowers" (American Florist, 1891), Willson and Calkins' "Familiar Colors," Oberthur and Dauthenay's "Repertoire des Couleurs" (1905), Leidel's "Hints on Tints" (1893), "Lefévré's Matieres Colorantes Artificiales" (1896), the Standard Dictionary chart of "typical colors," the educational colored papers of Milton Bradley and Prang, and many others; and besides these practically all of the artists' oil, water, and dry colors, manufactured by Winsor and Newton, F. Schoenfeld and Co., Charles Roberson and Co.,

George Rowney and Co., Madderton and Co., R. Ackermann and Co., Bourgeois, Binant, Chenal, Le Franc, Devoe, Raynolds, Osborne, Bradley, Hatfield and others; also the coal-tar or aniline dyes of Dr. G. Grübler & Co., Continental Color and Chemical Co., and Henry Heil Chemical Co., and the well known Diamond Dyes; chromo-lithographic inks, embroidery silks, etc., etc.

The material from which to select suitable color names was greatly augmented, almost at the last moment, from two sources, as follows: (1) A very large collection of color-samples (unfortunately mostly unnamed) collected and mounted on cards by Mr. Frederick A. Wampole, a talented young artist, to whom was delegated, by a Committee of the American Mycological Society, the task of preparing a nomenclature of colors based upon spectroscopic determinations, but which, unfortunately, the untimely death of Mr. Wampole prevented from progressing beyond the accumulation of this collection. For the use of this material I am indebted to the courtesy of Dr. Frederick V. Coville, Botanist of the U. S. Department of Agriculture, and Mr. P. L. Ricker, Assistant Botanist, Bureau of Plant Industry, in the same Department. (2) A splendid collection of colored Japanese silks, taffetas, velvets, and other dress goods, kindly sent me by Mr. C. H. Hospital, of the silk department of the firm of Woodward and Lothrop, Washington, D. C. The very large number of colors represented in this collection are all named and have afforded a considerable number of the names adopted in the present work.

For obvious reasons it has, of course, been necessary to ignore many trade names, through which the popular nomenclature of colors has become involved in really chaotic confusion rendered more confounded by the continual coinage of new names, many of them synonymous

and most of them vague and variable in their application. Most of them are invented, apparently without care or judgment, by the dyer or manufacturer of fabrics, and are as capricious in their meaning as in their origin; for example: Such fanciful names as "zulu," "serpent green," "baby blue," "new old rose," "London smoke," etc., and such nonsensical names as "ashes of roses" and "elephant's breath." An inspection of the sample books of manufacturers of fancy goods (such as embroidery silks and crewels, ribbons, velvets, and other dress- and upholstery-goods) is sufficient not only to illustrate the above observations, but to show also the absolute want of system or classification and the general unavailability of these trade names for adoption in a practical color nomenclature. This is very unfortunate, since many of these trade names have the merit of brevity and euphony and lack only the quality of stability

It has been difficult for the author to decide whether the standards of his original "Nomenclature of Colors" (1886) should be retained in the present work. Some of them are admittedly wrong (indeed, certain ones are not as they were intended to be); besides, owing to the method of reproducing the originals (hand stenciling) there is considerable variation in different copies of the book, one or more reprints, necessitating new mixtures of pigments, adding to this lack of uniformity.* Many persons, however, have urged the retention of the old standards, on the ground that they have been used by so many zoologists and botanists in their writings during the last twenty-five years that they have become estab-

*In the present work the possibility of variation between different copies is wholly eliminated by a very different process of reproduction. Each color, for the entire edition, is painted uniformly on large sheets of paper from a single mixture of pigments, these sheets being then cut into the small squares which represent the colors on the plates.

lished through common usage. This very important consideration has induced the author to retain such of the old standards as can be matched in the present work, even though some of them do not agree strictly with either his own or the usual conception of the colors in question. An asterisk (*) preceding a color name indicates that the name in question is adopted from the older work, the variation between different copies of the work requiring the selection, in the new one, of a color representing as nearly as possible an average of the former.

In any systematically arranged scheme, unless the number of colors shown is practically unlimited, it will, necessarily, be impossible to find represented thereon a certain proportion of colors comprised among even a very limlted number selected at random, or only roughly classified. Hence many (thirty-six, or more than five per cent.) of the colors shown in the old "Nomenclature of Colors" fall into the blank intervals of the present work, being intermediate either in hue or tone, or chroma, sometimes all. It is necessary of course to provide some means for the correlation of these with the present scheme, which is done by the list on page 41, where the positiou of each is shown.

The question of giving representations of metallic colors in this work was at one time considered; but the idea was abandoned for the reason that these are in reality only ordinary colors reflected from a metallic or burnished surface, or appearing as if so reflected; the actual hue is precisely the same, though often changeable according to angle of impact of the light rays, and relative position of the eye, this changeableness being sometimes due to interference.* Colors again vary, without actual difference of hue, in regard to quality of texture or surface; that is to say, the color may be quite

*See Rood, Modern Chromatics, pages 50-52.

lustreless, appearing on a dull, sometimes velvety surface, while again it may be more or less glossy, even to the degree of appearing as if varnished. To deal with these variations, however, requires simply the use of suitable adjectives. For example: To indicate a color which has no lustre or brightness, the adjective matt (or mat) may be used, in preference to *dull*, which implies reduction in purity or chroma; other adjectives, appropriate in special cases, being velvety, glossy, burnished metallic, matt-metallic, etc.

COLOR TERMS.—No other person has presented so forcibly the urgent need for reform in popular nomenclature nor stated so clearly and concisely its shortcomings and the simple remedy, as Mr. Milton Bradley, from one of whose educational pamphlets on the subject* the following is quoted: "The list of words now employed to express qualities or degrees of color is very small, in fact a half dozen comprise the more common terms, and these are pressed into service on all occasions, and in such varied relations that they not only fail to express anything definite but constantly contradict themselves . . . Tint, Hue and Shade are employed so loosely by the public generally, even by those people who claim to use English correctly, that neither word has a very definite meaning, although each is capable of being as accurately used as any other word in our every day vocabulary" . . .

Certainly one would expect that men of learning, at least, would employ the broader color terms correctly; but some of the highest autorities on color-physics habitually use them interchangeably, as if they were quite synonymous; and even the dictionaries, with few exceptions, give incorrect or "hazy" definitions of these

*Some criticisms of Popular Color Definitions and Suggestions for a better Color Nomenclature. Milton Bradley Co., Springfield, Mass. (Small pamphlet of 15 pages).

terms. It is not strictly correct to say a "dark tint" or "light shade" of any color, because a *tint* implies a color *paler* than the full color, while a shade means exactly the opposite; and to say an "orange shade (or tint) of red," a "greenish shade (or tint) of blue," a "bluish shade (or tint) of violet," etc., is an absurdity, for the term *hue*, which specifically and alone refers to relative position in the spectrum scale, without reference to lightness or darkness, is the only one which can correctly be used in such cases.

Indeed the standardization of color terms is almost if not quite as important, in the interest of educational progress, as that of the colors themselves and their names; therefore, to make easy a clear understanding of the specific meaning of each, the following definitions are given:—

Color.—The term of widest application, being the only one which can be used to cover the entire range of chromatic manifestation; that is to say, the spectrum colors (together with those between violet and red, not shown in the spectrum) with all their innumerable variations of luminosity, mixture, etc. In a more restricted sense, applied to the six distinct spectrum colors (red, orange, yellow, green, blue, and violet), which are sometimes distinguished as *fundamental colors* or *spectrum colors*.

Hue.—While often used interchangeably or synonymously with color, the term *hue* is more properly restricted by special application to those lying between any contiguous pair of spectrum colors (also between violet and purple and between purple and red); as an orange *hue* (not shade or tint, as so often incorrectly said) of red; a yellow *hue* of orange; a greenish *hue* of yellow, a bluish *hue* of green; a violet *hue* of blue, etc.

Tint.—Any color (pure or broken) weakened by high illumination or (in the case of pigments) by ad-

mixture of white, or (in the case of dyes or washes) by excess of aqueous or other liquid medium; as, a deep, medium, light, pale or delicate (pallid) *tint* of red. The term cannot correctly be used in any other sense.

Shade.—Any color (pure or broken) darkened by shadow or (in the case of pigments) by admixture of black; exactly the opposite of *tint*; as a medium, dark, or very dark (dusky) *shade* of red.

Tone.—"Each step in a color scale is a tone of that color."* The term tone cannot, however, be properly applied to a step in the spectrum scale, in which each contiguous pair of the six distinct spectrum or "fundamental" *colors* are connected by *hues*. Hence *tone*† is exclusively applicable to the steps in a scale of a single color or hue, comprising the full color (in the center) and graduated tints and shades leading off therefrom in opposite directions; or of neutral gray similarly graduated in tone from the darkest shade to the palest tint. Each one of the colored blocks in the vertical scales of the plates in this work represents a separate tone of that color.

Scale.—A linear series of colors showing a gradual transition from one to another, or a similar series of tones of one color. The first is a *chromatic scale*‡ (or scale of colors and hues) and in the plates of this work is represented by each horizontal series; the second is a

*Milton Bradley: Elementary Color, p. 25.

†Exception has been taken in a recent work ("A Color Notation," by A. H. Munsell) to the use of the term tone in this connection, on the ground that its proper use belongs to music, and the term *value* is substituted. The same line of reasoning would, however, certainly require the discarding of *chromatic scale* as a term of music nomenclature, since its derivation is clearly from color (chroma). Furthermore, the word "value" is even more elastic in its application than tone, and, all things considered, the present writer, at least, fails to see that any improvement is made by the proposed change.

‡The term *chromatic scale* has unfortunately been appropriated for a very different use (in music); nevertheless it is strictly correct in the present sense while in the other it is not, though firmly established by long usage. The term *spectrum scale* is not adequate, as a substitute, because the spectrum series of colors is incomplete through absence of the hues connecting violet with red, which are necessary to show the full scale of pure colors and hues.

tone scale, on the plates running vertically, growing from the full color, in the center, to a pale tint (at the top) and a dark shade (at the bottom). For clearer comprehension of these two distinct scales, each plate of this work may be compared to a sheet of woven fabric; the chromatic scale (horizontal) representing the warp, the luminosity or tone scale (vertical) the woof. A third kind of color scale is represented by adding progressive increments of neutral gray to any color. This is shown by the several series of Plates, of which the first (Plates I-XII, with colors numbered 1-71) represents each step in the spectrum scale unmixed with gray, followed by five other series in which the same colors* are shown dulled by gradually increasing increments of neutral gray, the first (Plates XIII-XXVI, colors 1′-71′) containing 32 per cent., the second (Plates XXVII-XXXVIII, colors 1″-71″) 58 per cent., the third (Plates XXXIX-XLIV, colors 1‴-69‴) 77 per cent., the fourth (Plates XLV-L, colors 1⁗-69⁗) 90 per cent., and the fifth (Plates LI-LIII, colors 1⁗′, 15⁗′, 23⁗′, 35⁗′, 49⁗′, 59⁗′ and 67⁗′) 95.5 per cent. of gray, the last being in reality colored grays. Finally scales are shown (on Plate LIII) of neutral gray (in which all trace of color is wanting), and of carbon gray, a simple mixture of lamp-black and chinese white. It is not easy to find a suitable name for these scales of reduced or "broken" colors, but they may, for present convenience, be termed *reduced* or *broken scales*.

Full Color.—A color corresponding in intensity with its manifestation in the solar spectrum.

*The distinctions of color or hue diminishing in proportion to the increased admixture of gray, each alternate color or hue, with its scale (vertical) of tones, is omitted from the third and fourth series; while in the fifth the color differentiation is so greatly reduced that only the six spectrum colors (dulled by admixture of 95.5 per cent. of neutral gray), together with purple (the intermediate between violet and red) are given; a yellow orange hue being substituted for spectrum orange because it is more exactly intermediate in hue between red and yellow.

Pure Color.—A color corresponding in purity with (or, in the case of material colors, closely approximating to) one of the spectrum colors.

Broken Color.—Any one of the spectrum colors or hues dulled or reduced in purity by admixture (in any proportion) of neutral gray, or varying relative proportions of both black and white; also produced by admixture of certain spectrum colors, as red with green, orange with blue, yellow with violet, etc. These broken colors are far more numerous in Nature than the pure spectrum colors, and include the almost infinite variations of brown, russet, citrine, olive, drab, etc. They are often called dull or neutral colors.

Fundamental Colors.—The six psychologically distinct colors of the solar spectrum; Red, Orange, Yellow, Green, Blue and Violet.

Primary Colors.—Theoretically, any of the spectrum colors which cannot be made by mixture of two other colors. According to the generally accepted Young-Helmholtz theory, the primary colors are red, green, and violet; orange and yellow resulting from a mixture of red and green, and blue from a mixture of green and violet. There is considerable difference of opinion, however, as to this question, and further investigation of the subject seems to be required; at any rate, authorities fail to explain why red may be exactly reproduced (except as to the degree of luminosity) by a mixture of orange and violet, exactly as yellow results from mixture of red and green or blue from green or violet, green being, in fact, the only spectrum color that cannot be made by mixture of other colors.*

*J. J. Müller found that a mixture of the orange and violet rays of the spectrum produced a whitish red (Rood, "Modern Chromatics," p. 129). The author of the present work, without being at the time aware of this, produced an absolutely pure red (but of reduced intensity) by mixture of either orange and violet (orange 63.5, violet 36.5 per cent.=red 85+white 15 per cent.), or from orange and the violet-red which is complementary to green (violet-red 51, orange 49 per cent.), the latter equaling red 89+white 11 per cent; the mixtures being made on a color wheel with Maxwell disks representing the pure colors of the present work. The red resulting from either of these mixtures on the color-wheel is far purer than the blue resulting from mixture of green and violet, and incomparably more so that the yellow resulting from mixture of either red and green or orange and green. Consequently, if the same results would come from mixing orange and violet light, it is difficult to understand how red can be a primary color *according to the accepted definition.*

Chroma.—Degree of freedom from white light; purity, intensity or fullness of color.

Luminosity.—Degree of brightness or clearness. The relative luminosity of the spectrum colors is as follows: [Yellow (brightest)?], orange yellow; orange; greenish-yellow, yellow-green, and green; orange-red; red and blue (equal); violet-blue, blue-violet, violet.*

Warm Colors.—The colors nearer the red end of the spectrum or those of longer wave-lengths (red, orange, and yellow, and connecting hues) "and combinations in which they predominate."†

Cool, or Cold, Colors.—The colors nearer the violet end of the spectrum or those of shorter wave-length, especially blue and green-blue. "But it is, perhaps, questionable whether green and violet may be termed either warm or cool."

Complementary Color.—"As white light is the sum of all color, if we take from white light a given color the remaining color is the complement of the given color." When any two colors or hues which when combined in proper proportion on the color-wheel produce, by rotation, neutral gray, these two colors each represent the complementary of the other.

Constants of Color.—The constants of color are numbers which measure (1) the wave-length, (2) the chroma, and (3) the luminosity.

In addition to the terms defined above there are many others, for which the reader is referred to the chapter on "Color Definitions" on pages 23-30 of Milton Bradley's excellent and most useful book "Elementary Color."

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*Rood: Modern Chromatics, p. 34.

With the single exception of Vanderpoel (Color Problems, p. 28, plates 3, 4, where yellow is given first in order of luminosity) all authorities on color-physics that I have been able to consult very singularly ignore yellow entirely in their treatment of the subject of luminosity.

†All quotations here are from Milton Bradley's "Elementary Color," except where otherwise noted.

TABLE OF PERCENTAGES OF COMPONENT COLORS IN THE CONNECTING HUES OF THE CHROMATIC SCALE.

The following table shows the relative percentages, in color-wheel measurement, of the two components in each of the hues connecting adjacent pairs of the six spectrum colors as represented on the original Plates of this work; together with an equal number of exact intermediates (not shown on the Plates), the latter in lower-case type and not indicated by symbols.

Number.	Color.	Red.	Orange.	Yellow.	Green.	Blue.	Violet.	Wavelength.[1]
1	**Red**	**100**						644
2		90	10					
3	**O-R**	**80**	**20**					
4		70	30					
5	**OO-R**	**60**	**40**					
6		50	50					
7	**R-O**	**40**	**60**					
8		30	70					
9	**OR-O**	**20**	**80**					
10		10	90					
11	**Orange**		**100**					598
12			96	4				
13	**OY-O**		**91**	**9**				
14			86	14				
15	**Y-O**		**80**	**20**				
16			73.5	26.5				
17	**O-Y**		**65**	**35**				
18			56.5	43.5				
19	**YO-Y**		**47**	**53**				
20			36.5	63.5				
21	**O-YY**		**25**	**75**				
22			13.5	86.5				
23	**Yellow**			**100**				577
24				87	13			
25	**YG-Y**			**75**	**25**			
26				64	36			
27	**G-Y**			**55**	**45**			
28				46	54			
29	**GG-Y**			**39**	**61**			
30				31	69			

1 As determined by Dr. P. G. Nutting, Associate Physicist, U. S. Bureau of Standards.

TABLE OF PERCENTAGES—Continued.

Number	Color.	Red.	Orange.	Yellow.	Green.	Blue.	Violet.	Wave-length.[1]
31	**Y-G**	.....	.....	**24**	**76**	.....	.....	
32	....	.....	.....	17	83	.....	.....	
33	**GY-G**	.....	.....	**11**	**89**	.....	.....	
34	.....	.....	.....	6	94	.....	.....	
35	**Green**	.....	.....	.....	**100**	.....	.....	520
36	.....	.....	.....	.....	96.5	3.5	.....	
37	**GB-G**	.....	.....	.....	**93**	**7**	.....	
38	.....	.....	.....	.....	90	10	.....	
39	**B-G**	.....	.....	.....	**85**	**15**	.....	
40	.....	.....	.....	.....	81	19	.....	
41	**BB-G**	.....	.....	.....	**75**	**25**	.....	
42	.....	.....	.....	.....	69	31	.....	
43	**G-B**	.....	.....	.....	**61**	**39**	.....	
44	.....	.....	.....	.....	54	46	.....	
45	**BG-B**	.....	.....	.....	**45**	**55**	.....	
46	.....	.....	.....	.....	36	64	.....	
47	**G-BB**	.....	.....	.....	**25**	**75**	.....	
48	.....	.....	.....	.....	13	87	.....	
49	**Blue**	.....	.....	.....	.....	**100**	.....	473
50	....	.....	.....	.....	.....	84	16	
51	**BV-B**	.....	.....	.....	.....	**72**	**28**	
52	.....	.....	.....	.....	.....	64	36	
53	**V-B**	.....	.....	.....	.....	**54**	**46**	
54	.....	.....	.....	.....	.....	47	53	
55	**B-V**	.....	.....	.....	.....	**40**	**60**	
56	.....	.....	.....	.....	.....	32	68	
57	**VB-V**	.....	.....	.....	.....	**22**	**78**	
58	....	.....	.....	.....	....	12	88	
59	**Violet**	.....	.....	.....	.....	.....	**100**	410
60	.....	3	.....	.....	.....	.....	97	
61	**VR-V**	**7**	.....	.....	.....	.....	**93**	
62	.....	11	.....	.....	.....	.....	89	
63	**R-V**	**18**	.....	.....	.....	.....	**82**	
64	.....	24	.....	.....	.....	.....	76	
65	**RR-V**	**33**	.....	.....	.....	.....	**67**	
66	.....	41	.....	.....	.....	.....	59	
67	**V-R**	**52**	.....	.....	.....	.....	**48**	
68	.....	64	.....	.....	.....	.....	36	
69	**RV-R**	**74**	.....	.....	.....	.....	**26**	
70	.....	83	.....	.....	.....	.....	17	
71	**V-RR**	**90**	.....	.....	.....	.....	**10**	
72	.....	95.5	.....	.....	.....	.....	4.5	

1 As determined by Dr. P. G. Nutting, Associate Physicist, U. S. Bureau of Standards.

TABLE SHOWING PERCENTAGE OF WHITE AND BLACK, RESPECTIVELY, IN EACH TONE OF THE TONE OR LUMINOSITY SCALES.

All of the vertical scales in the original Plates of this work (the scale of carbon grays alone excepted) contain the following percentages by color-wheel measurement:

TONE.	PERCENTAGES.		
	White.	Color.	Black.
(White)	**100**	.....	.....
(g)	70	30	.....
f	**45**	**55**	....
(e)	32	68	.....
d	**22.5**	**77.5**	.....
(c)	15	85	.....
b	**9.5**	**90.5**	.....
(a)	5	95	.....
(Full Color)	.....	**100**	.....
(h)	.....	64	26
i	.....	**55**	**45**
(j)	.....	41	59
k	.....	**29.5**	**70.5**
(l)	.....	20	80
m	.....	**12.5**	**87.5**
(n)	.....	6	94
(Black)	....	.....	**100**

One of the most serious difficulties encountered in the preparation of the Plates of this work was the apparent impracticability of reproducing satisfactory shades of pure colors. This originated in the fact that there seems to be no substance (pigment, dye, or fabric) which represents a true black, all reflecting more or less of white light, and consequently producing shades which are dull

or broken. The difficulty is increased by the additional fact that any black pigment mixed with almost any color falls short of even the color-wheel mixture in purity of hue in the resulting shades, owing to the very considerable amount of gray in all black pigments. Chromolithography can be made to produce clearer and better shades of the pure colors, but is distinctly objectionable for the purpose of a work of this kind owing to eventual oxidation of the oil or varnish with which the pigments are combined in lithographic inks, causing a change of hue; reds becoming more orange, blues more greenish, etc., in course of time.

While the absence (in large part) of pure chromatic shades is much to be regretted, the defect is not so serious, *from the standpoint of utility*, as might appear at first sight; for while saturated or darkened pure colors are not uncommon in the animal, vegetable, and mineral kingdoms, more or less broken dark colors are infinitely more so; and since the latter are greatly increased in number by the defect mentioned the actual result is rather an advantage than otherwise.

It will doubtless be noticed that there is a conspicuous difference in relative darkness between shades of yellow and contiguous hues on the one hand and corresponding ones of violet and adjacent hues on the other, as if the percentage of black in each were very different. This, however, is entirely the result of difference of luminosity of the two sets of colors, that of yellow being between 7000 and 8000 while that of violet is only about 1300;* for the percentage of black in corresponding tones of the vertical scales is precisely the same for each color throughout the chromatic scale of this work.

*See Rood, Modern Chromatics, pages 34, 35.

TABLE SHOWING PERCENTAGES OF NEUTRAL GRAY IN THE BROKEN COLOR SCALES.

Every Plate in each series of broken colors (′ to ″″) contains exactly the same percentage of neutral gray in each color, the relative amount increasing progressively in the several series, as shown in the followiug table. The percentages of white in the tints and of black in the shades of the tone scales are in all cases exactly the same as in the tone scales of pure colors.

SERIES.	PERCENTAGES.	
	Color.	Neutral Gray.
Pure Colors	100	.....
(′)	68	32
(″)	42	58
(‴)	23	77
(⁗)	10	90
(″″)	4.5	95.5
Neutral Gray	.....	100

TABLE OF PERCENTAGE OF BLACK AND WHITE IN THE DIFFERENT TONES OF CARBON GRAY.

TONE NUMBER.	PERCENTAGES.	
	Black.	White.
1	100	.....
2	98	2
3	94.5	5.5
4	89.5	10.5
5	83	17
6	75	25
7	67,5	32.5
8	58.5	41.5
9	47	53
10	30	70

Note.—The percentages given in the preceding tables may not in all cases be precisely those actually contained in the colors on the Plates, since absolute precision in reproduction is hardly possible. All that can be claimed is a reasonably close approximation to the ideal.

DYES AND PIGMENTS USED IN THE PREPARATION OF THE MAXWELL DISKS, REPRESENTING THE THIRTY-SIX COLORS OF THE PURE SPECTRUM SCALE, FORMING THE BASIS OF THE COLOR-SCHEME OF THIS WORK.*

Red.—Devoe's *geranium lake* (dry), its orange hue neutralized by a wash of *rhodamin b*. (*Crocein scarlet b*. washed with *rhodamin b*. produces practically the same fine red.)

Hues between red and orange.—*Crocein scarlet b*. with *gold orange*.

Orange.—*Gold orange* with *orange g*.

Hues between orange and yellow.—*Orange g*. with *auramin*.

Yellow.—*Auramin*, rather dilute. (The best substitute among pigments is a fine quality of *zinc yellow*, as Hatfield's.)

Hues between yellow and green.—*Auramin* washed with *light green*.

Green.—*Auramin* (very dilute) washed with *light green*. (The auramin should be applied first, because it "sets" or becomes fast quickly, while the light green does not, but is largely removed by overwashes of the yellow, thus rendering it very difficult to get the desired hue.)

Hues between green and blue.—*Methyl green;* the same washed with *light blue* (Diamond Dye); for the hues nearer blue, *light blue* washed with Winsor and Newton's *permanent blue* or *new blue* (the least violet-hued of the artificial ultramarines).

Blue.—*Light blue* washed with *permanent blue* or *new blue*. (Although the color is nearer that of the artificial ultramarines named, it is useless to apply the latter first,

*The aniline or coal-tar dyes named are all of the manufacture of Dr. G. Grübler and Co., Leipzig, Germany, unless otherwise stated. (See Preface, page ii.)

for overwashes of the light blue merely sink through and darken the color without improving the hue. A moderately saturated solution of the light blue should be applied first, and when this is dry covered with one or more rather thin washes of the permanent blue or new blue).

Hues between blue and violet.—Winsor and Newton's *permanent blue* and some of the more violet-hued artificial ultramarines, the hues nearer violet washed with *crystal violet* or *gentian violet*.

Violet.—*Crystal violet*.

Hues between violet and red.—*Methyl violet 1b*. washed with *rhodamin b.;* for hues nearer red, *rhodamin b*. with Devoe's *geranium red* (dry) or *crocein scarlet b*.

While more or less similar in hue to rhodamin b., several other aniline dyes, as *acid fuchsin*, *rubin s.*, *rosein*, *magenta*, etc., do not combine satisfactorily with the violets, the mixture soon becoming dark or dull and none of them are quite as pure a purple or red-violet.

It is most important to remember that disks thus colored must be carefully protected from light when not in actual use and *never* exposed to direct sunlight. The artificial ultramarines are, of course, permanent, and so, practically, are crocein scarlet, gold orange, orange g., and auramin—that is to say, are not materially affected by the action of light except after very prolonged exposure, though the last named undergoes a change of hue; but the green and violet aniline dyes are all very evanescent, rapidly fading and eventually disappearing; light blue and rhodamin, while sensitive to light, are far less so than the greens and violets.

ALPHABETICAL LIST OF COLORS REPRESENTED ON PLATES OF THIS WORK

COLOR NAME.	Plate.	Color or hue Number.	Tone.
Absinthe Green	XXXI	29″	—
Acajou Red	XIII	1′	*i*
Acetin Blue	XXXV	49″	*k*
Ackermann's Green	XVII	35′	*k*
Aconite Violet	XXXVII	63″	—
Ageratum Violet	XXXVII	63″	*b*
Alice Blue	XXXIV	45″	*b*
Alizarine Blue	XXI	51′	*m*
Alizarine Pink	XIII	1′	*d*
Amaranth Pink	XII	69	*d*
Amaranth Purple	XII	69	*i*
Amber Brown	III	13	*k*
Amber Yellow	XVI	21′	*b*
American Green	XLI	33‴	*i*
Amethyst Violet	XI	61	—
Amparo Blue	IX	51	*b*
Amparo Purple	XI	63	*b*
Andover Green	XLVII	25⁗	*i*
Aniline Black	L	69⁗	*m*
Aniline Lilac	XXXV	53″	*d*
Aniline Yellow	IV	19	*i*
Anthracene Green	VII	39	*m*
Anthracene Purple	XLIV	69‴	*k*
Anthracene Violet	XXV	61′	*k*
Antimony Yellow	XV	17′	*b*
Antique Brown	III	17	*k*
Antique Green	VI	33	*m*
*Antwerp Blue	VIII	45	*k*
*Apple Green	XVII	29′	—
Apricot Buff	XIV	11′	*b*
Apricot Orange	XIV	11′	—
Apricot Yellow	IV	19	*b*
Argus Brown	III	13	*m*
Argyle Purple	XXXVII	65″	*b*
Army Brown	XL	13‴	*i*
Artemisia Green	XLVII	33⁗	—
Asphodel Green	XLI	29‴	—
*Aster Purple	XII	67	*i*
Auburn	II	11	*m*
*Auricula Purple	XXVI	69′	*k*
Avellaneous	XL	17‴	*b*
Azurite Blue	IX	53	*m*
Barium Yellow	XVI	23′	*d*
Baryta Yellow	IV	21	*f*
*Bay	II	7	*m*
Begonia Rose	I	1	*b*
Benzo Brown	XLVI	13⁗	*i*
Benzol Green	VII	41	—
*Berlin Blue	VIII	47	*m*
Beryl Blue	VIII	43	*f*
*Beryl Green	XIX	41′	*b*
*Bice Green	XVII	29′	*k*
Biscay Green	XXXI	27″	*i*
Bishop's Purple	XXXVII	65″	—
*Bister	XXIX	15″	*m*
Bittersweet Orange	II	9	*b*
Bittersweet Pink	II	9	*d*
*Black	LIII	—	(*l*)
Blackish Brown (1)	XLV	1⁗	*m*
Blackish Brown (2)	XLV	5⁗	*m*
Blackish Brown (3)	XLV	9⁗	*m*
Blackish Green-Blue	VIII	43	*m*
Blackish Green-Gray	LII	35⁗⁗	*m*
Blackish Mouse Gray	LI	15⁗⁗	*m*
Blackish Plumbeous	LII	49⁗⁗	*k*
Blackish Purple	XI	65	*m*
Blackish Red-Purple	XII	67	*m*
*Blackish Slate	LIII	—	*m* (*3*)
Blackish Violet	X	59	*m*
Blackish Violet-Gray	LII	59⁗⁗	*m*
Blanc's Blue	XX	47′	*k*
Blanc's Violet	XXIII	59′	*k*
Blue-Violet	X	55	—
Blue-Violet Black	XLIX	57⁗	*m*
Bluish Black	XLIX	49⁗	*m*
Bluish Glaucous	XLII	37‴	*f*
Bluish Gray-Green	XLII	41‴	—
Bluish Lavender	XXXVI	57″	*d*
Bluish Slate-Black	XLVIII	45⁗	*m*
Bluish Violet	X	57	—
Bone Brown	XL	13‴	*m*
Bordeaux	XII	71	*k*
*Bottle Green	XIX	37′	*m*
Bradley's Blue	IX	51	—
Bradley's Violet	XXIII	59′	—
Brazil Red	I	5	*i*
Bremen Blue	XX	43′	*b*
*Brick Red	XIII	5′	*k*
Bright Chalcedony Yellow	XVII	25′	—
Bright Green-Yellow	V	9	—
Brownish Drab	XLV	9⁗	—
Brownish Olive	XXX	19″	*m*

COLOR NAME.	Plate.	Color or hue Number.	Tone.
Brownish Vinaceous	XXXIX	5‴	*b*
Brussels Brown	III	15	*m*
Buckthorn Brown	XV	17′	*i*
*Buff-Pink	XXVIII	11″	*d*
Buffy Brown	XL	17‴	*i*
Buffy Citrine	XVI	19′	*k*
Buffy Olive	XXX	21″	*k*
*Buff-Yellow	IV	21	*d*
Burn Blue	XXXIV	47″	*f*
Burnt Lake	XII	71	*m*
*Burnt Sienna	II	9	*k*
*Burnt Umber	XXVIII	9″	*m*
Cacao Brown	XXVIII	9″	*i*
Cadet Blue	XXI	49′	*i*
Cadet Gray	XLII	45‴	*b*
*Cadmium Orange	III	13	—
*Cadmium Yellow	III	17	—
Calamine Blue	VIII	43	*d*
Calla Green	V	25	*m*
Calliste Green	VI	31	*i*
Cameo Brown	XXVIII	7″	*k*
Cameo Pink	XXVI	71′	*f*
*Campanula Blue	XXIV	57	*b*
Capri Blue	XX	43′	*i*
Capucine Buff	III	13	*f*
Capucine Orange	III	13	*d*
Capucine Yellow	III	15	*b*
*Carmine	I	1	*i*
Carnelian Red	XIV	7′	—
Carob Brown	XIV	9′	*m*
Carrot Red	XIV	7′	*b*
Cartridge Buff	XXX	19″	*f*
Castor Gray	LII	35⁗	*i*
Cedar Green	VI	31	*m*
Celandine Green	XLVII	33⁗	*b*
Cendre Blue	VIII	43	*b*
Cendre Green	VI	35	*b*
Cerro Green	V	27	*m*
*Cerulean Blue	VIII	45	—
Chaetura Black	XLVI	17⁗	*m*
Chaetura Drab	XLVI	17⁗	*k*
Chalcedony Yellow	XVII	25′	—
Chamois	XXX	19″	*b*
Chapman's Blue	XXII	49*	*i*
Chartreuse Yellow	XXXI	25″	*d*
Chatenay Pink	XIII	3′	*f*
Chessylite Blue	XX	45′	*k*
*Chestnut	II	9	*m*
Chestnut-Brown	XIV	11′	*m*
Chicory Blue	XXIV	59*	*d*
*China Blue	XX	45′	*i*
Chinese Violet	XXV	65′	*b*
*Chocolate	XXVIII	7″	*m*
*Chromium Green	XXXII	31″	*i*
Chrysolite Green	XXXI	27″	*b*
Chrysopraise Green	VII	37	*b*
*Cinereous	LII	45⁗	*d*
*Cinnamon	XXXI	15″	—
Cinnamon-Brown	XV	15′	*k*
Cinnamon-Buff	XXIX	15″	*d*
Cinnamon-Drab	XLVI	13‴	—
*Cinnamon-Rufous	XIV	11′	*i*
Citrine	IV	21	*k*
Citrine-Drab	XL	19‴	*i*
Citron Green	XXXI	25″	*b*
*Citron Yellow	XVI	23′	*b*
Civette Green	XVIII	31′	*k*
*Claret Brown	I	5	*m*
*Clay Color	XXIX	17″	—
Clear Cadet Blue	XXI	49′	—
Clear Dull Green Yellow	XVII	25′	*b*
Clear Fluorite Green	XXXII	33″	*b*
Clear Blue-Green Gray	XLVIII	45⁗	*d*
Clear Payne's Gray	XLIX	49⁗	*b*
Clear Windsor Blue	XXXV	49″	—
Clear Yellow-Green	VI	31	*b*
*Clove Brown	XL	17‴	*m*
Cobalt Green	XIX	37′	*b*
Colonial Buff	XXX	21″	*d*
Columbia Blue	XXXIV	47″	*b*
Commelina Blue	XXI	51′	—
Congo Pink	XXVIII	7″	*b*
Coral Pink	XIII	5′	*d*
*Coral Red	XIII	5′	—
Corinthian Pink	XXVII	3″	*d*
Corinthian Purple	XXXVIII	69″	*k*
Corinthian Red	XXVII	3″	—
Cornflower Blue	XXI	53′	—
Corydalis Green	XLI	29‴	*d*
Cossack Green	VI	33	*m*
Cosse Green	V	29	*i*
Cotinga Purple	XI	63	*k*
Courge Green	XVII	25′	*i*
Court Gray	XLVII	29⁗	*f*
*Cream-Buff	XXX	19″	*d*
*Cream Color	XVI	19′	*f*
Cress Green	XXXI	29″	*k*
*Cyanine Blue	IX	51	*m*
Dahlia Carmine	XXVI	71′	*k*
*Dahlia Purple	XII	67	*k*

COLOR NAME.	Plate.	Color or hue Number.	Tone.
Danube Green	XXXII	35″	*m*
Daphne Pink	XXXVIII	69″	*b*
Daphne Red	XXXVIII	69″	—
Dark American Green	XLI	29‴	*k*
Dark Aniline Blue	X	55	*m*
Dark Anthracene Violet	XXV	61′	*m*
Dark Bluish Glaucous	XLII	37‴	*b*
Dark Bluish Gray-Green	XLII	41‴	*k*
Dark Bluish Violet	X	57	*m*
Dark Cadet Blue	XXI	49′	*m*
Dark Chessylite Blue	XX	45′	*m*
Dark Cinnabar Green	XIX	39′	*k*
Dark Citrine	IV	21	*m*
Dark Corinthian Purple	XXXIX	69″	*m*
Dark Cress Green	XXXI	29″	*m*
Dark Delft Blue	XLII	45‴	*m*
Dark Diva Blue	XXI	51	*k*
Dark Dull Blue-Violet	XXXVI	55″	*k*
Dark Dull Bluish Violet (1)	XXIV	57*	*k*
Dark Dull Bluish Violet (2)	XXXV	51″	*k*
Dark Dull Bluish Violet (3)	XXXVI	57″	*k*
Dark Dull Violet-Blue	XXIV	53*	*k*
Dark Dull Yellow-Green	XXXII	31″	*m*
Dark Glaucous-Gray	XLVIII	37⁗	*b*
Dark Gobelin Blue	XXXIV	43″	*k*
Dark Grayish Blue-Green	XLVIII	37⁗	*k*
Dark Grayish Blue-Violet	XXIV	55*	*k*
Dark Grayish Brown	XLV	5⁗	*k*
Dark Grayish Lavender	XLIII	57‴	*b*
Dark Grayish Olive	XLVI	21⁗	*k*
Dark Green	XVIII	35′	*m*
Dark Green-Blue Gray	XLVIII	45⁗	—
Dark Green-Blue Slate	XLVIII	45⁗	*k*
Dark Greenish Glaucous	XLI	29‴	*b*
Dark Greenish Olive	XXX	23″	*m*
Dark Gull Gray	LIII	—	(6)
Dark Heliotrope Gray	L	65⁗	—
Dark Heliotrope Slate	L	65⁗	*k*
Dark Hyssop Violet	XXXVI	59″	*k*
Dark Indian Red	XXVII	3″	*m*
Dark Ivy Green	XLVI	25⁗	*k*
Dark Lavender	XLIV	61‴	*b*
Dark Livid Brown	XXXIX	1‴	*k*
Dark Livid Purple	XXXVII	63″	*m*
Dark Livid Red	XXXIX	1″	*k*
Dark Madder Blue	XLIII	53‴	*k*
Dark Madder Violet	XXV	63′	*m*
Dark Maroon Purple	XXVI	71′	*m*
Dark Medici Blue	XLVIII	41⁗	*i*
Dark Mineral Red	XXVII	1″	*m*
Dark Mouse Gray	LI	15⁗	*k*
Dark Naphthalene Violet	XXXVII	61″	*m*
Dark Neutral Gray	LIII	—	*k*
Dark Nigrosin Violet	XXV	65′	*m*
Dark Olive	XL	21‴	*m*
Dark Olive-Buff	XL	21‴	—
Dark Olive-Gray	LI	23⁗	*i*
Dark Orient Blue	XXXIV	45″	*k*
Dark Payne's Gray	XLIX	49⁗	*k*
Dark Perilla Purple	XXXVII	65″	*m*
Dark Plumbago Blue	XLIII	53‴	*b*
Dark Plumbago Gray	L	61⁗	—
Dark Plumbago Slate	L	61⁗	*k*
Dark Plumbeous	LII	49⁗	*i*
Dark Porcelain Green	XXXIII	39″	*k*
Dark Purple-Drab	XLV	1⁗	*i*
Dark Purplish Gray	LIII	67⁗	*k*
Dark Quaker Drab	LI	1⁗	*k*
Dark Russian Green	XLII	37‴	*k*
Dark Slate-Purple	XLIV	65‴	*k*
Dark Slate-Violet (1)	XLIII	57‴	*k*
Dark Slate-Violet (2)	XLIV	61‴	*k*
Dark Soft Blue-Violet	XXIII	55′	*k*
Dark Soft Bluish Violet	XXIII	57′	*k*
Dark Sulphate Green	XIX	39′	*i*
Dark Terre Verte	XXXIII	41″	*k*
Dark Tyrian Blue	XXXIV	47″	*k*
Dark Varley's Gray	XLIX	57⁗	*k*
Dark Vinaceous	XXVII	1″	—
Dark Vinaceous-Brown	XXXIX	5‴	*k*
Dark Vinaceous-Drab	XLV	5⁗	*i*
Dark Vinaceous-Gray	L	69⁗	—
Dark Vinaceous-Purple	XXXVIII	67″	*k*
Dark Violet	X	59	*k*
Dark Violet-Gray	LII	59⁗	*k*
Dark Violet-Slate	XLIX	53⁗	*k*
Dark Viridian Green	VII	37	*k*
Dark Yellowish Green	XVIII	33′	*m*
Dark Yvette Violet	XXXVI	55″	*m*
Dark Zinc Green	XIX	37′	*k*
Dauphin's Violet	XXIII	59′	*i*
Dawn Gray	LII	35⁗	*d*
Deep Aniline Lilac	XXXV	53″	*h*
Deep Blue-Violet	X	55	*i*
Deep Bluish Glaucous	XLII	37‴	*d*
Deep Bluish Gray-Green	XLII	41‴	*i*
Deep Brownish Drab	XLV	9⁗	*i*
Deep Brownish Vinaceous	XXXIX	5‴	—
Deep Cadet Blue	XXI	49′	*k*
Deep Chicory Blue	XXIV	57*	*b*

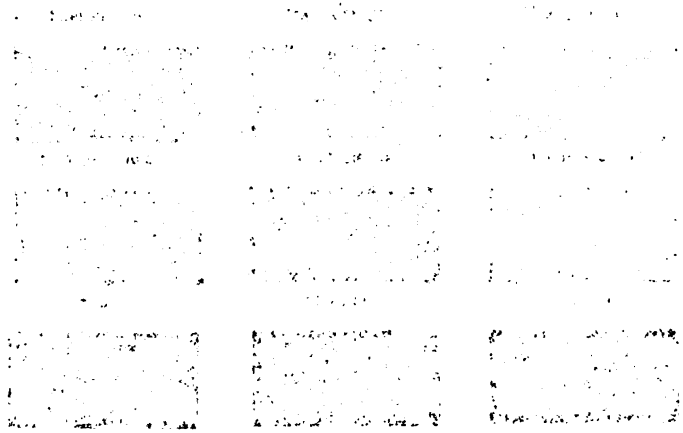
COLOR NAME.	Plate.	Color or hue Number.	Tone.
*Deep Chrome	III	17	*b*
Deep Chrysolite Green	XXXI	27″	—
Deep Colonial Buff	XXX	21″	*b*
Deep Corinthian Red	XXVII	3″	*i*
Deep Delft Blue	XLII	45‴	*k*
Deep Dull Bluish Violet (1)	XXIV	57*	*i*
Deep Dull Bluish Violet (2)	XXXV	51″	*i*
Deep Dull Bluish Violet (3)	XXXVI	57″	*i*
Deep Dull Lavender	XLIV	61⁗	*d*
Deep Dull Violaceous Blue	XXII	51*	*k*
Deep Dull Violet-Blue	XXXV	53″	*i*
Deep Dull Yellow-Green (1)	XXXII	31″	*k*
Deep Dull Yellow-Green (2)	XXXII	33″	*k*
Deep Dutch Blue	XLIII	49‴	—
Deep Glaucous-Gray	XLVIII	37⁗	*d*
Deep Glaucous-Green	XXXII	39″	*b*
Deep Grape Green	XLI	25‴	*i*
Deep Grayish Blue-Green	XLVIII	37⁗	*i*
Deep Grayish Lavender	XLIII	57‴	*d*
Deep Grayish Olive	XLVI	21⁗	*i*
Deep Green-Blue Gray	XLVIII	45⁗	*b*
Deep Greenish Glaucous	XLI	29‴	*d*
Deep Gull Gray	LIII	—	*b*(7)
Deep Heliotrope Gray	L	65⁗	*b*
Deep Hellebore Red	XXXVIII	71″	*i*
Deep Hyssop Violet	XXXVI	59″	*i*
Deep Lavender	XXXVI	59″	*d*
Deep Lavender-Blue	XXI	53′	*b*
Deep Lichen Green	XXXIII	37″	*d*
Deep Livid Brown	XXXIX	1‴	*i*
Deep Livid Purple	XXXVII	63″	*k*
Deep Madder Blue	XLIII	53‴	*i*
Deep Malachite Green	XXXII	35″	—
Deep Medici Blue	XLVIII	41⁗	—
Deep Mouse Gray	LI	15⁗	*i*
Deep Neutral Gray	LIII	—	*i*
Deep Olive	XL	21‴	*k*
Deep Olive-Buff	XL	21‴	*b*
Deep Olive-Gray	LI	23⁗	—
Deep Orient Blue	XXXIV	45″	*i*
Deep Payne's Gray	XLIX	49⁗	*i*
Deep Plumbago Blue	XLIII	53‴	*d*
Deep Plumbago Gray	L	61⁗	*b*
Deep Plumbeous	LII	49⁗	—
Deep Purplish Gray	LIII	67⁗	*i*
Deep Purplish Vinaceous	XLIV	69‴	—
Deep Quaker Drab	LI	1⁗	*i*
Deep Rose-Pink	XII	71	*d*
Deep Seafoam Green	XXXI	27″	*d*
Deep Slate-Blue	XLIII	49‴	*k*
Deep Slate-Green	XLVII	33⁗	*k*
Deep Slate-Olive	XLVI	29⁗	*k*
Deep Slate-Violet	XLIV	61‴	*i*
Deep Slaty Brown	L	69⁗	*k*
Deep Soft Blue-Violet	XXIII	55′	*i*
Deep Soft Bluish Violet	XXIII	57′	*i*
Deep Turtle Green	XXXII	31″	—
Deep Varley's Gray	XLIX	57⁗	*i*
Deep Vinaceous	XXVII	1″	*b*
Deep Vinaceous-Gray	L	69⁗	*b*
Deep Vinaceous-Lavender	XLIV	65‴	*d*
Deep Violet-Gray	LII	59⁗	*i*
Deep Violet-Plumbeous	XLIX	53⁗	—
Deep Wedgewood Blue	XXI	51′	*d*
Delft Blue	XLII	45‴	*i*
Diamin-Azo Blue	XXXV	51″	*m*
Diamine Brown	XIII	3′	*m*
Diamine Green	VII	37	*m*
Diva Blue	XXI	51′	*i*
*Drab	XLVI	17⁗	—
*Drab-Gray	XLVI	17⁗	*d*
*Dragons-blood Red	XIII	5′	*i*
Dresden Brown	XV	17′	*k*
Duck Green	XIX	39′	*m*
Dull Blackish Green	XLI	29‴	*m*
Dull Blue-Green Black	XLVIII	41⁗	*m*
Dull Blue-Violet (1)	XXIV	55*	—
Dull Blue-Violet (2)	XXXVI	55″	*i*
Dull Bluish Violet (1)	XXIV	57*	—
Dull Bluish Violet (2)	XXXV	51″	—
Dull Bluish Violet (3)	XXXVI	57″	—
Dull Citrine	XVI	21′	*k*
Dull Dark Purple	XXVI	67′	*k*
Dull Dusky Purple	XXVI	67′	*m*
Dull Greenish Black (1)	XLVII	29⁗	*m*
Dull Greenish Black (2)	XLVII	33⁗	*m*
Dull Green-Yellow	XVII	27′	—
Dull Indian Purple	XLIV	69‴	*i*
Dull Lavender	XLIV	61‴	*f*
Dull Magenta Purple	XXVI	67′	*i*
Dull Opaline Green	XIX	37′	*f*
Dull Purplish Black	L	65⁗	*m*
Dull Slate-Violet	XLIII	57‴	*i*
Dull Violet-Black (1)	XLIV	61‴	*m*
Dull Violet-Black (2)	XLIX	53⁗	*m*
Dull Violet-Black (3)	L	61⁗	*m*
Dull Violaceous Blue	XXII	51*	—
Dull Violet-Blue	XXXV	53″	—
Dusky Auricula Purple	XXVI	69′	*m*
Dusky Blue	XXII	49*	*m*

COLOR NAME.	Plate.	Color or hue Number.	Tone.
Dusky Blue-Green	XXXIII	39″	*m*
Dusky Bluish Green	XXXIII	41″	*m*
Dusky Blue-Violet (1)	XXIII	57′	*m*
Dusky Blue-Violet (2)	XXIV	55*	*m*
Dusky Brown	XLV	1‴	*k*
Dusky Drab	XLV	9‴	*k*
Dusky Dull Bluish Green	XLII	41‴	*m*
Dusky Dull Green	XLII	37‴	*m*
Dusky Dull Violet (1)	XXXVI	57″	*m*
Dusky Dull Violet (2)	XXXVI	59″	*m*
Dusky Dull Violet-Blue	XXXV	53″	*m*
Dusky Green	XXXIII	37″	*m*
Dusky Green-Blue (1)	XX	43′	*m*
Dusky Green-Blue (2)	XXXIV	43″	*m*
Dusky Green-Gray	LII	35⁗	*k*
Dusky Greenish Blue	XX	47′	*m*
Dusky Neutral Gray	LIII	—	*m*
Dusky Olive-Green	XLI	25‴	*m*
Dusky Orient Blue	XXXIV	45″	*m*
Dusky Purplish Gray	LIII	67⁗	*m*
Dusky Slate-Blue	XLIII	49‴	*m*
Dusky Slate-Violet	XLIII	57‴	*m*
Dusky Violet	XXIII	59′	*m*
Dusky Violet-Blue (1)	XXIII	55′	*m*
Dusky Violet-Blue (2)	XLIII	53‴	*m*
Dusky Yellowish Green	XLI	27‴	*m*
Dutch Blue	XLIII	49‴	*b*
*Ecru-Drab	XLVI	13⁗	*d*
Ecru-Olive	XXX	21″	*i*
Elm Green	XVII	27′	*m*
*Emerald Green	VI	35	—
Empire Green	XXXII	33″	*m*
Empire Yellow	IV	21	*b*
Endive Blue	XLIII	49‴	*d*
English Red	II	7	*i*
Eosine Pink	I	1	*d*
Etain Blue	XX	43′	*f*
Ethyl Green	VII	41	*i*
Eton Blue	XXII	49*	*k*
Etruscan Red	XXVII	5″	—
Eugenia Red	XIII	1′	—
Eupatorium Purple	XXXVIII	67″	—
*Fawn Color	XL	13‴	—
*Ferruginous	XIV	9′	*i*
*Flame Scarlet	II	9	—
*Flax-flower Blue	XXI	51′	*b*
*Flesh Color	XIV	7′	*d*
Flesh Ocher	XIV	9′	*b*
Flesh Pink	XIII	5′	*f*
Fluorite Green	XXXII	33″	—
Fluorite Violet	XI	61	*m*
Forest Green	XVII	29′	*m*
Forget-me-not Blue	XXII	51*	*b*
*French Gray	LII	49⁗	*f*
*French Green	XXXII	35″	*i*
Fuscous	XLVI	13⁗	*k*
Fuscous-Black	XLVI	13⁗	*m*
Garnet Brown	I	3	*k*
Gendarme Blue	XXII	47*	*k*
Gentian Blue	XXI	53′	*i*
*Geranium Pink	I	3	*d*
Glass Green	XXXI	29″	*d*
Glaucous	XLI	29‴	*f*
*Glaucous-Blue	XXXIV	43″	*b*
Glaucous-Gray	XLVIII	37⁗	*f*
*Glaucous-Green	XXXIII	39″	*d*
Gnaphalium Green	XLVII	29⁗	*d*
Gobelin Blue	XXXIV	43″	*i*
Grape Green	XLI	25‴	—
*Grass Green	VI	33	*k*
Grayish Blue-Green	XLVIII	37⁗	—
Grayish Blue-Violet (1)	XXIV	55*	*i*
Grayish Blue-Violet (2)	XXXV	51″	*b*
Grayish Lavender	XLIII	57‴	*f*
Grayish Olive	XLVI	21⁗	—
Grayish Violaceous Blue	XXII	51*	*i*
Grayish Violet-Blue	XXIV	53*	*i*
Green-Blue Slate	XLVIII	45⁗	*i*
Green-Yellow	V	27	*b*
Greenish Glaucous	XLI	33‴	*f*
Greenish Glaucous-Blue	XLII	41‴	*b*
Greenish Slate-Black	XLVIII	37⁗	*m*
Greenish Yellow	V	25	—
Grenadine	II	7	*b*
Grenadine Pink	II	7	*d*
Grenadine Red	II	7	—
Guinea Green	VII	39	*i*
Gull Gray	LIII	—	*d*(8)
Haematite Red	XXVII	5″	*m*
Haematoxylin Violet	XXV	61′	*i*
*Hair Brown	XLVI	17⁗	*i*
Hathi Gray	LII	35⁗	*b*
Hay's Blue	IX	53	*k*
Hay's Brown	XXXIX	9‴	*k*
Hay's Green	XVIII	33′	*k*
Hay's Lilac	XXXVII	63″	*d*
Hay's Maroon	XIII	1′	*m*
Hay's Russet	XIV	7′	*k*
*Hazel	XIV	11′	*k*
Heliotrope-Gray	L	65⁗	*d*

COLOR NAME.	Plate.	Color or hue Number.	Tone.
Heliotrope-Slate	L	65''''	*i*
Hellebore Green	XVII	25′	*m*
Hellebore Red	XXXVIII	71″	—
Helvetia Blue	IX	51	*k*
Hermosa Pink	I	1	*f*
Hessian Brown	XIII	5′	*m*
Honey Yellow	XXX	19″	—
Hortense Blue	XXII	47*	*m*
Hortense Violet	XI	61	*b*
*Hyacinth Blue	X	55	*k*
Hyacinth Violet	XI	61	*i*
Hydrangea Pink	XXVII	5″	*f*
Hydrangea Red	XXVII	1″	*i*
Hyssop Violet	XXXVI	59″	—
Indian Lake	XXVI	71′	*i*
*Indian Purple	XXXVIII	67″	*m*
Indian Red	XXVII	3″	*k*
*Indigo Blue	XXXIV	47″	*m*
Indulin Blue	XXII	51*	*m*
Invisible Green	XIX	41′	*m*
Iron Gray	LI	23'''''	*k*
*Isabella Color	XXX	19″	*i*
Italian Blue	VIII	43	—
Ivory Yellow	XXX	21″	*f*
Ivy Green	XXXI	25″	*m*
Jade Green	XXXI	27″	*k*
Japan Rose	XXVIII	9″	*b*
Jasper Green	XXXIII	37″	*i*
Jasper Pink	XIII	3′	*d*
Jasper Red	XIII	3′	—
Javel Green	V	27	*i*
Jay Blue	XXII	47*	*i*
Jovence Blue	XX	43′	*k*
Kaiser Brown	XIV	9′	*k*
Kildare Green	XXXI	29″	*b*
Killarney Green	XVIII	35′	*i*
King's Blue	XXII	47*	*b*
Kronberg's Green	XXXI	25″	*k*
Laelia Pink	XXXVIII	67″	*d*
La France Pink	I	3	*f*
*Lavender	XXXVI	59″	*f*
Lavender-Blue	XXI	53′	*d*
*Lavender-Gray	XLIII	49'''	*f*
Lavender-Violet	XXV	61′	*b*
Leaf Green	XLI	29'''	*k*
Leitch's Blue	VIII	47	*i*
Lemon Chrome	IV	21	—
*Lemon Yellow	IV	23	—
Lettuce Green	V	29	*k*
Lichen Green	XXXIII	37″	*f*

COLOR NAME.	Plate	Color or hue Number.	Tone.
Light Alice Blue	XXXIV	45″	*d*
Light Amparo Blue	IX	51	*d*
Light Amparo Purple	XI	63	*d*
Light Bice Green	XVII	29′	*i*
Light Blue-Green	VII	39	*d*
Light Blue-Violet	X	55	*b*
Light Bluish Violet	X	57	*b*
Light Brownish Drab	XLV	9''''	*b*
Light Brownish Olive	XXX	19″	*k*
Light Brownish Vinaceous	XXXIX	5'''	*d*
Light Buff	XV	17′	*f*
Light Cadet Blue	XXI	49′	*b*
Light Cadmium	IV	19	—
Light Campanula Blue	XXIV	55*	*d*
Light Celandine Green	XLVII	33''''	*d*
Light Cendre Green	VI	35	*d*
Light Cerulean Blue	VIII	45	*b*
Light Chalcedony Yellow	XVII	25′	*d*
Light Chicory Blue	XXIV	57*	*f*
Light Cinnamon-Drab	XLVI	13''''	*b*
Light Columbia Blue	XXXIV	47″	*d*
Light Congo Pink	XXVIII	7″	*d*
Light Coral Red	XIII	5′	*b*
Light Corinthian Red	XXVII	3″	*b*
Light Cress Green	XXXI	29″	*i*
Light Danube Green	XXXII	35″	*k*
Light Drab	XLVI	17''''	*b*
Light Dull Bluish Violet	XXXVI	57″	*b*
Light Dull Green-Yellow	XVII	27′	*d*
Light Elm Green	XVII	27′	*i*
Light Fluorite Green	XXXII	33″	*d*
Light Forget-me-not Blue	XXII	51*	*d*
Light Glaucous-Blue	XXXIV	43″	*d*
Light Dull Glaucous-Blue	XLII	41'''	*d*
Light Grape Green	XLI	25'''	*b*
Light Grayish Blue-Violet	XXXV	51″	*d*
Light Grayish Olive	XLVI	21''''	*b*
Light Grayish Vinaceous	XXXIX	9'''	*d*
Light Grayish Violet-Blue	XXIV	53*	*b*
Light Greenish Yellow	V	25	*b*
Light Green-Yellow	V	27	*d*
Light Gull Gray	LIII		*f* (9)
Light Heliotrope-Gray	L	65''''	*f*
Light Hellebore Green	XVII	25′	*k*
Light Hortense Violet	XI	61	*d*
Light Hyssop Violet	XXXVI	59″	*b*
Light Jasper Red	XIII	3′	*b*
Light King's Blue	XXII	47*	*d*
Light Lavender-Blue	XXI	53′	*f*
Light Lavender-Violet	XXV	61′	*d*

COLOR NAME.	Plate.	Color or hue Number.	Tone.
Light Lobelia Violet	XXXVII	61″	*d*
Light Lumiere Green	XVII	29′	*d*
Light Mallow Purple	XII	67	*d*
Light Mauve	XXV	63′	*d*
Light Medici Blue	XLVIII	41‴	*d*
Light Methyl Blue	VIII	47	*b*
Light Mineral Gray	XLVII	25‴	*f*
Light Mouse Gray	LI	15⁗	*b*
Light Neropalin Blue	XXII	49*	*d*
Light Neutral Gray	LIII	—	*b*
Light Niagara Green	XXXIII	41″	*d*
Light Ochraceous-Buff	XV	15′	*d*
Light Ochraceous-Salmon	XV	13′	*d*
Light Olive-Gray	LI	23⁗	*d*
Light Orange-Yellow	III	17	*d*
Light Oriental Green	XVIII	33′	*b*
Light Paris Green	XVIII	35′	*d*
Light Payne's Gray	XLIX	49‴	*d*
Light Perilla Purple	XXXVII	65″	*i*
Light Phlox Purple	XI	65	*d*
Light Pinkish Cinnamon	XXIX	15″	*d*
Light Pinkish Lilac	XXXVII	65″	*f*
Light Plumbago Gray	L	61‴	*f*
Light Porcelain Green	XXXIII	39″	—
Light Purple-Drab	XLV	1‴	*b*
Light Purplish Gray	LIII	67⁗	*b*
Light Purplish Vinaceous	XXXIX	1‴	*d*
Light Quaker Drab	LI	1⁗	*b*
Light Rosolane Purple	XXVI	69′	*b*
Light Russet-Vinaceous	XXXIX	9″	*b*
Light Salmon-Orange	II	11	*d*
Light Seal Brown	XXXIX	9‴	*m*
Light Sky Blue	XX	47′	*f*
Light Soft Blue-Violet	XXIII	55′	*b*
Light Squill Blue	XX	45′	*d*
Light Sulphate Green	XIX	39′	*b*
Light Terre Verte	XXXIII	41″	—
Light Turtle Green	XXXII	31″	*d*
Light Tyrian Blue	XXXIV	47″	—
Light Varley's Gray	XLIX	57‴	*b*
Light Vinaceous-Cinnamon	XXIX	13″	*d*
Light Vinaceous-Drab	XLV	5‴	*b*
Light Vinaceous-Fawn	XL	13‴	*d*
Light Vinaceous-Gray	L	69‴	*f*
Light Vinaceous-Lilac	XLIV	69‴	*d*
Light Vinaceous-Purple	XLIV	65‴	*b*
Light Violet	X	59	*b*
Light Violet-Blue	IX	53	*b*
Light Violet-Gray	LII	59⁗	*b*
Light Violet-Plumbeous	XLIX	53‴	*d*
Light Viridine Green	VI	33	*f*
Light Viridine Yellow	V	29	*d*
Light Windsor Blue	XXXV	49″	*b*
Light Wistaria Blue	XXIII	57′	*d*
Light Wistaria Violet	XXIII	59′	*d*
Light Yellow-Green	VI	31	*d*
Light Yellowish Olive	XXX	23″	*i*
*Lilac	XXV	65′	*d*
*Lilac-Gray	LII	59⁗	*f*
Lily Green	XLVII	33‴	*i*
Lime Green	XXXI	25″	—
Lincoln Green	XLI	25‴	*k*
Liseran Purple	XXVI	67′	*b*
Litho. Purple	XXV	63′	*i*
*Liver Brown	XIV	7′	*m*
Livid Brown	XXXIX	1‴	—
Livid Pink	XXVII	3″	*f*
Livid Purple	XXXVII	63″	*i*
Livid Violet	XXXVII	61″	*i*
Lobelia Violet	XXXVII	61″	*b*
Lumiere Blue	XX	43′	*d*
Lumiere Green	XVII	29′	*b*
Lyons Blue	IX	51	*i*
Madder Blue	XLIII	53‴	—
*Madder Brown	XIII	3′	*k*
Madder Violet	XXV	63′	*k*
*Magenta	XXVI	67′	—
Mahogany Red	II	7	*k*
*Maize Yellow	III	19	*f*
*Malachite Green	XXXII	35″	*b*
Mallow Pink	XII	67	*f*
Mallow Purple	XII	67	*b*
Manganese Violet	XXV	63′	—
Marguerite Yellow	XXX	23″	*f*
*Marine Blue	VIII	45	*m*
*Maroon	I	3	*m*
*Mars Brown	XV	13′	*m*
Mars Orange	II	9	
Mars Violet	XXXVIII	71″	*m*
Mars Yellow	III	15	*i*
Martius Yellow	III	23	*f*
Massicot Yellow	XVI	21′	*f*
Mathews' Blue	XX	45′	—
Mathews' Purple	XXV	65′	—
*Mauve	XXV	63′	*b*
Mauvette	XXV	65′	*f*
Mazarine Blue	IX	49	*d*
Meadow Green	VI	35	*k*
Medal Bronze	III	19	*m*
Medici Blue	XLVIII	41‴	*b*



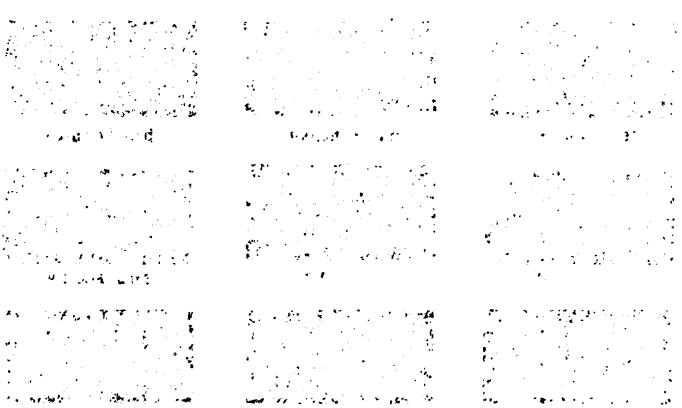

7. R-O.
9. OR-O.
11. ORANGE
f
Safrano Pink
Orient Pink
Orange-Pink
d
Grenadine Pink
Bittersweet Pink
Light Salmon-Orange
b
Grenadine
Bittersweet Orange
Salmon-Orange
Grenadine Red
*Flame Scarlet
*Orange Chrome
i
English Red
Mars Orange
*Orange Rufous
k
Mahogany Red
*Burnt Sienna
Sanford's Brown
m
*Bay
*Chestnut
Auburn

CAUTION!!!

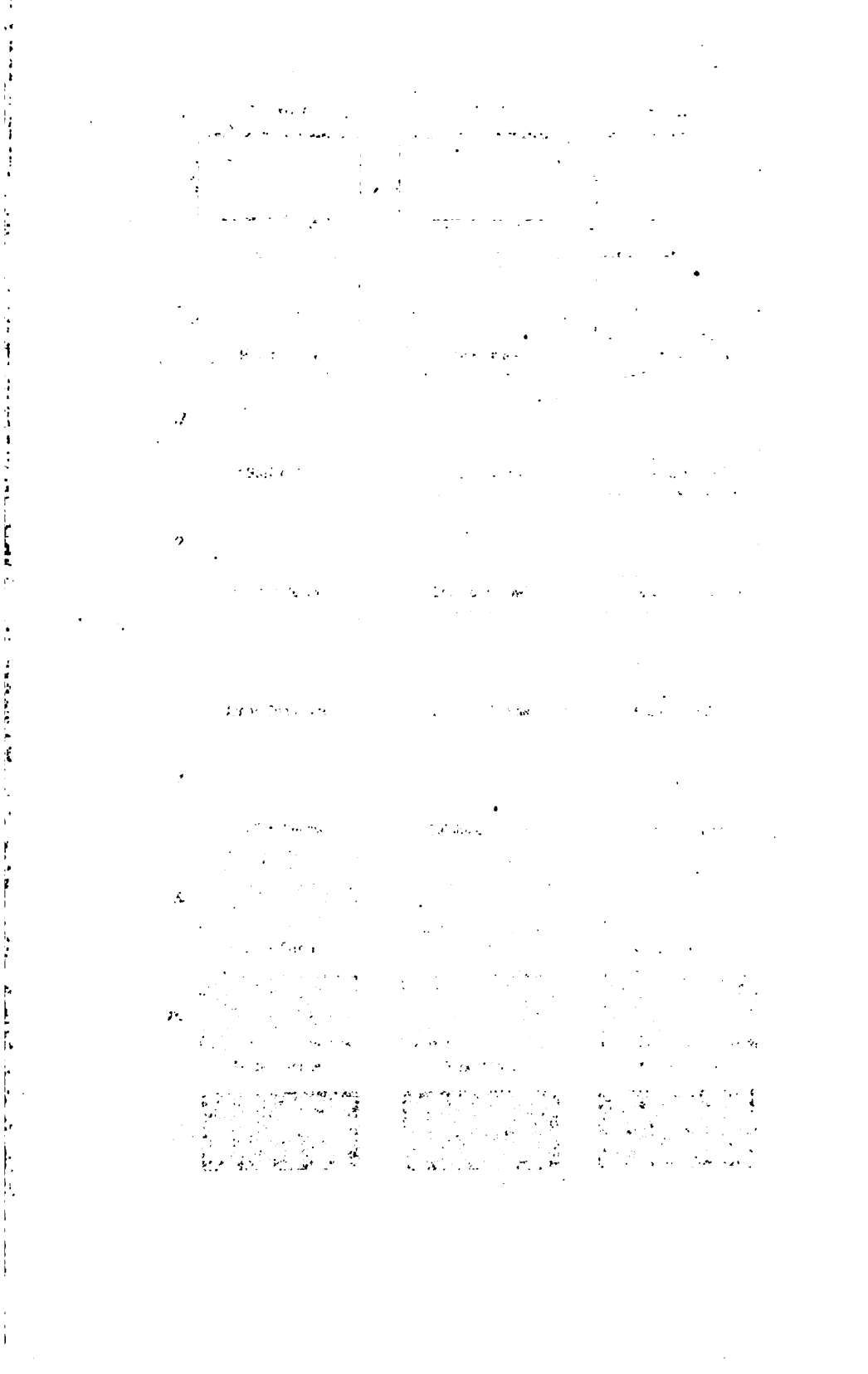
DO NOT EXPOSE THESE PLATES TO THE LIGHT FOR A LONGER TIME THAN IS NECESSARY.

THE pigments used in the preparation of these Plates are the most durable known, those which have been proven unstable having been, as far as possible, discarded. The latter include carmine and other cochineal lakes, colors of vegetable origin (as gamboge, violet carmine, indigo, etc.), and most of the aniline or coal tar dyes, though among the last are a considerable number which are really more permanent than several colors habitually used by artists. Certain colors in this work could not, however, possibly be reproduced except by the employment of pigments which are more or less sensitive to *prolonged exposure* to light, and hence this caution not to expose the plates unnecessarily.

(See *Church:* "The Chemistry of Paints and Painting," third edition, pages 257-263.)

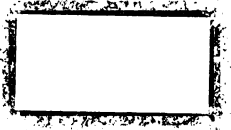
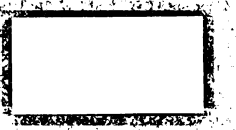
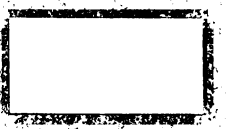
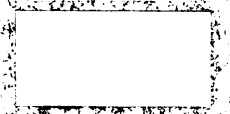
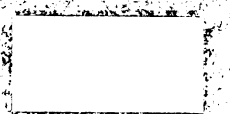
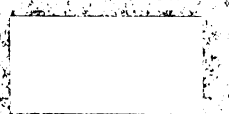
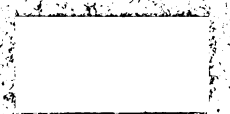
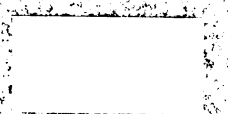
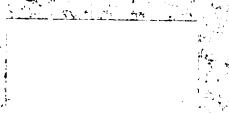
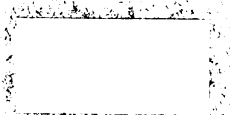
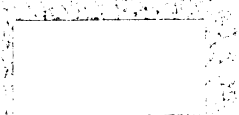
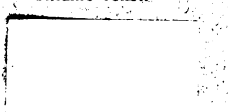
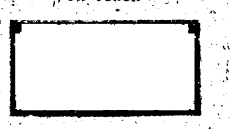
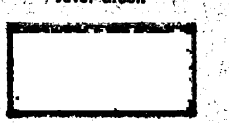
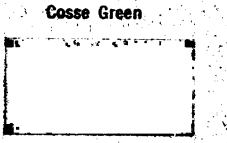
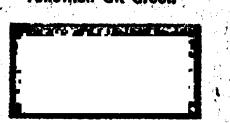
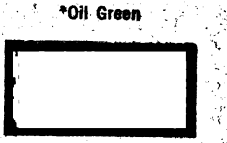
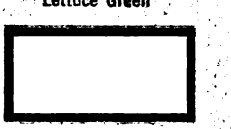



13. OY-O.
15. Y-O.
17. O-Y.
f
Capucine Buff
Pale Yellow-Orange
Pale Orange-Yellow
d
Capucine Orange
*Orange-Buff
Light Orange-Yellow
b
Mikado Orange
Capucine Yellow
*Deep Chrome
*Cadmium Orange
*Orange
*Cadmium Yellow
i
Xanthine Orange
Mars Yellow
*Raw Sienna
k
Amber Brown
Sudan Brown
Antique Brown
m
Argus Brown
Brussels Brown
*Raw Umber

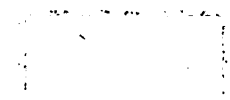


	19. YO-Y.	21. O-YY.	23. YELLOW
f			
	*Maize Yellow	Baryta Yellow	Martius Yellow
d			
	*Buff-Yellow	Pinard Yellow	Picric Yellow
b			
	Apricot Yellow	Empire Yellow	Pale Lemon Yellow
	Light Cadmium	Lemon Chrome	*Lemon Yellow

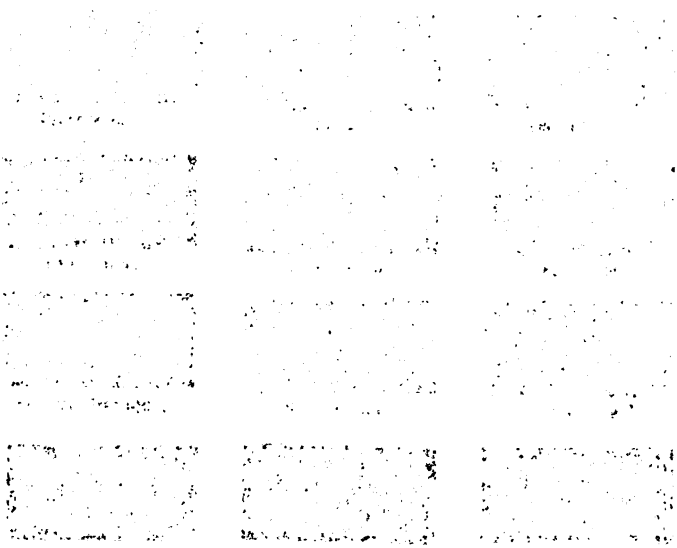
i			
	Aniline Yellow	Sulphine Yellow	Pyrite Yellow
k			
	Orange-Citrine	Citrine	Warbler Green
m			
	Medal Bronze	Dark Citrine	*Olive-Green

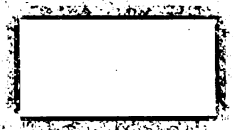
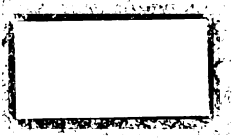
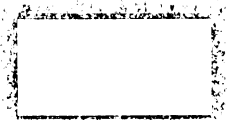
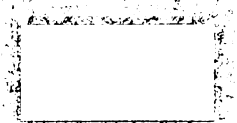
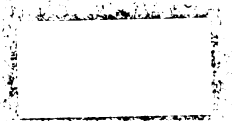
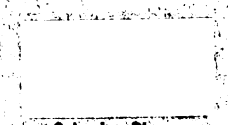
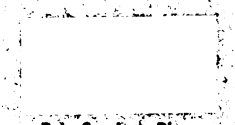
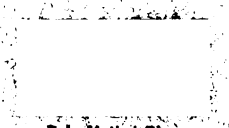
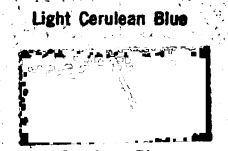
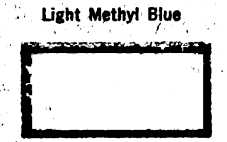
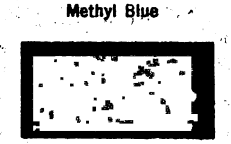
	25. YG-Y.	27. G-Y.	29. GG-Y.
			
f			
	*Sulphur Yellow	Pale Green-Yellow	Pale Viridine Yellow
d			
	Pale Greenish Yellow	Light Green-Yellow	Light Viridine Yellow
b			
	Light Greenish Yellow	Green-Yellow	Viridine Yellow
			
a	Greenish Yellow	Bright Green-Yellow	Neva Green
i			
	Oil Yellow	Javel Green	Cosse Green
k			
	Yellowish Oil Green	*Oil Green	Lettuce Green
m			
	Calla Green	Cerro Green	Spinach Green
			

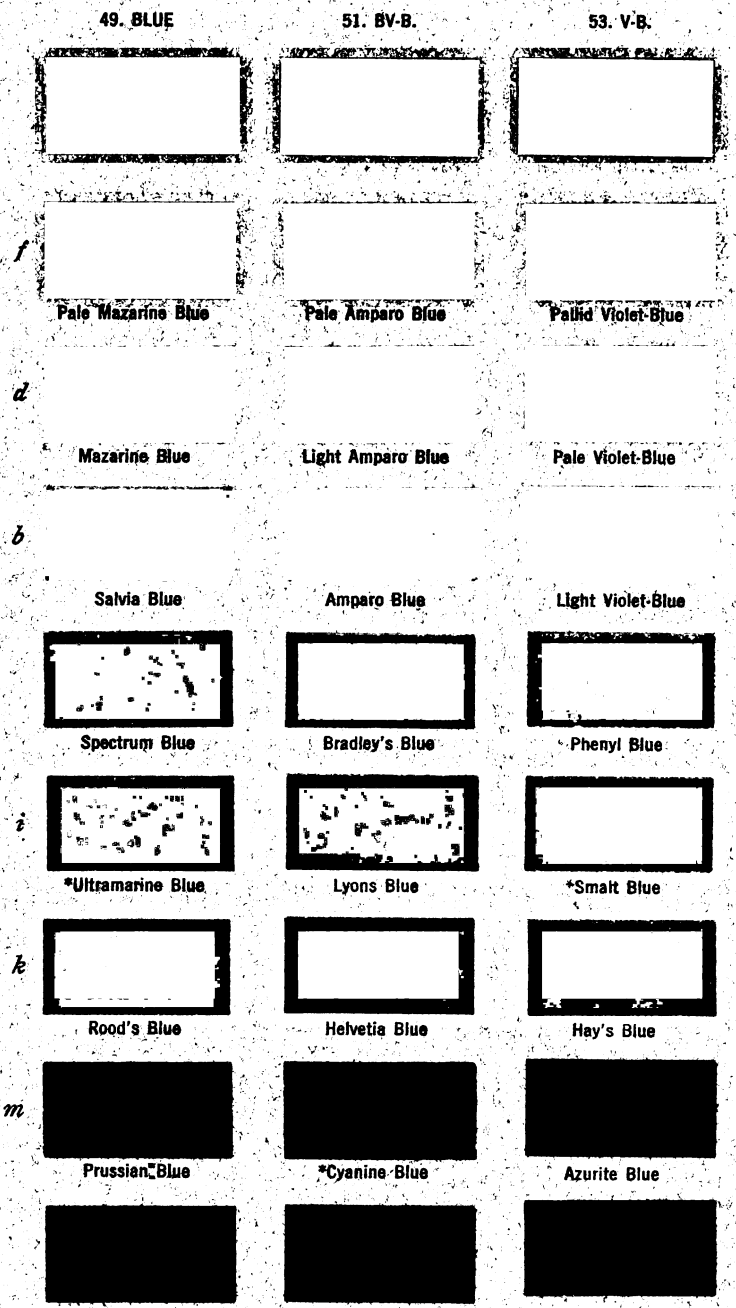

31. Y-G.
33. GY-G.
35. GREEN
f
Pale Yellow-Green
Light Viridine Green
Pale Cendre Green
d
Light Yellow-Green
Viridine Green
Light Cendre Green
b
Clear Yellow-Green
Vanderpoel's Green
Cendre Green
Yellow-Green
Night Green
*Emerald Green
j
Calliste Green
Scheele's Green
Peacock Green
k
*Parrot Green
*Grass Green
Meadow Green
m
Cedar Green
Cossack Green
Antique Green

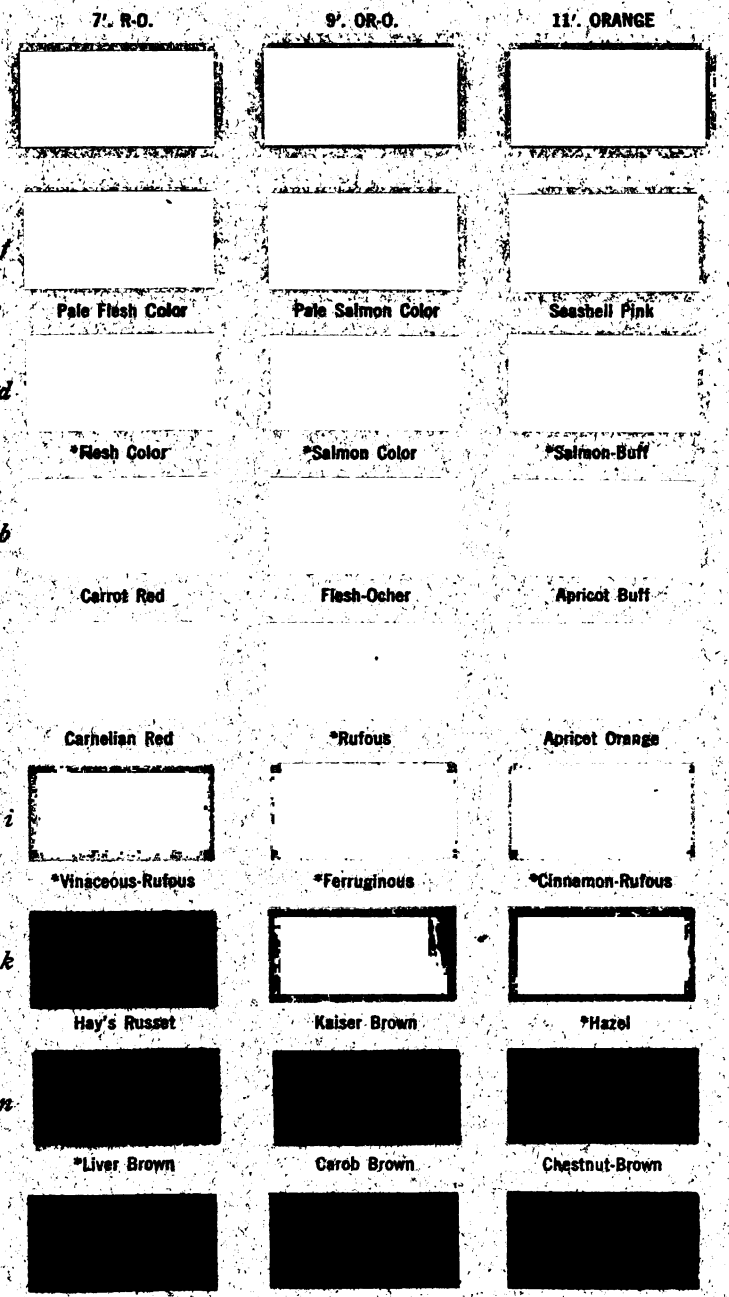


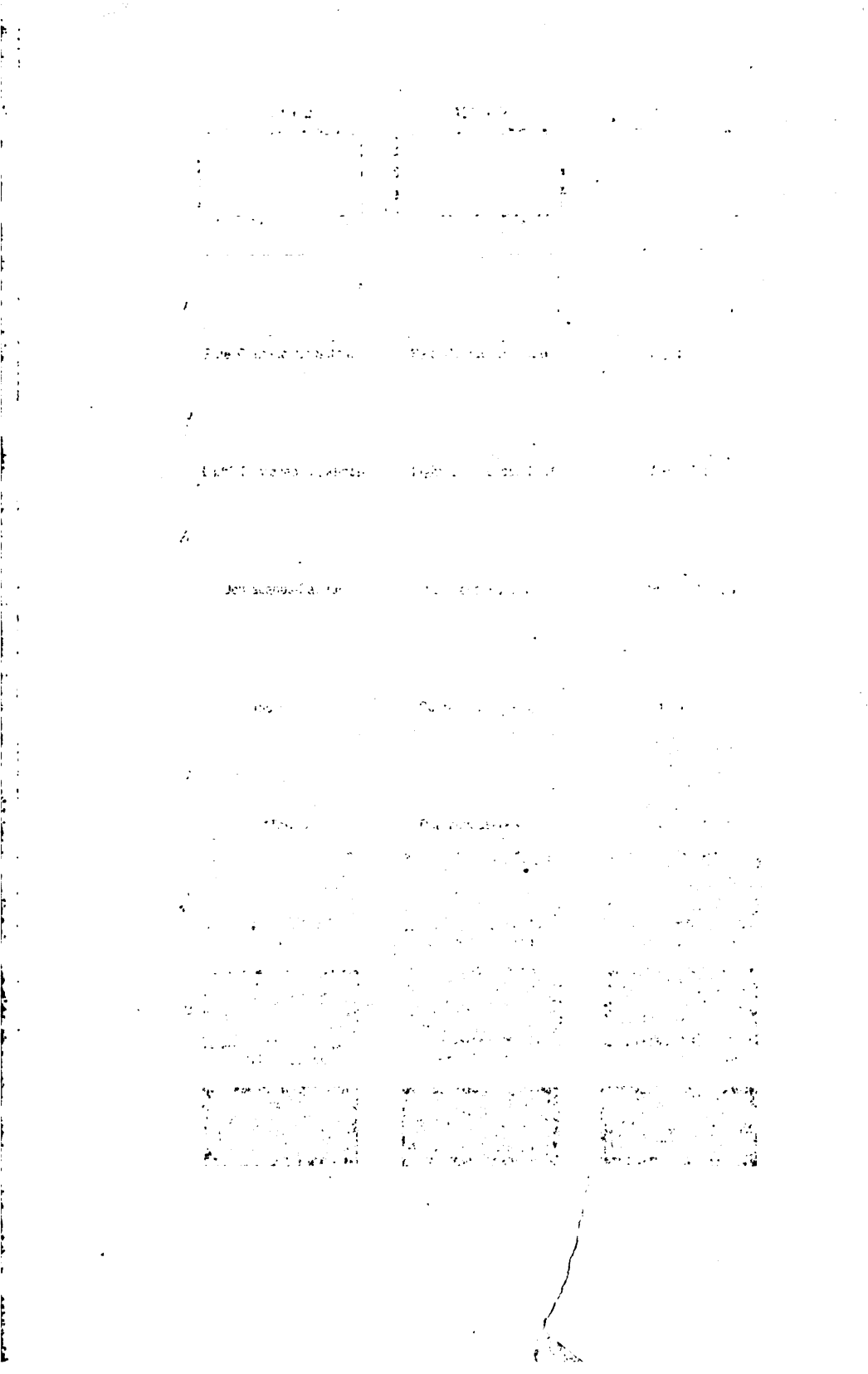

37. GB-G.
39. B-G.
41. BB-G.
f
Opaline Green
Pale Blue-Green
Pale Turquoise Green
d
Neuvider Green
Light Blue-Green
Turquoise Green
b
Chrysoprase Green
Tyrolite Green
Venice Green
Vivid Green
Skobeloff Green
Benzol Green
i
*Viridian Green
Guinea Green
Ethyl Green
k
Dark Viridian Green
Wall Green
Sorrento Green
m
Diamine Green
Anthracene Green
*Myrtle Green

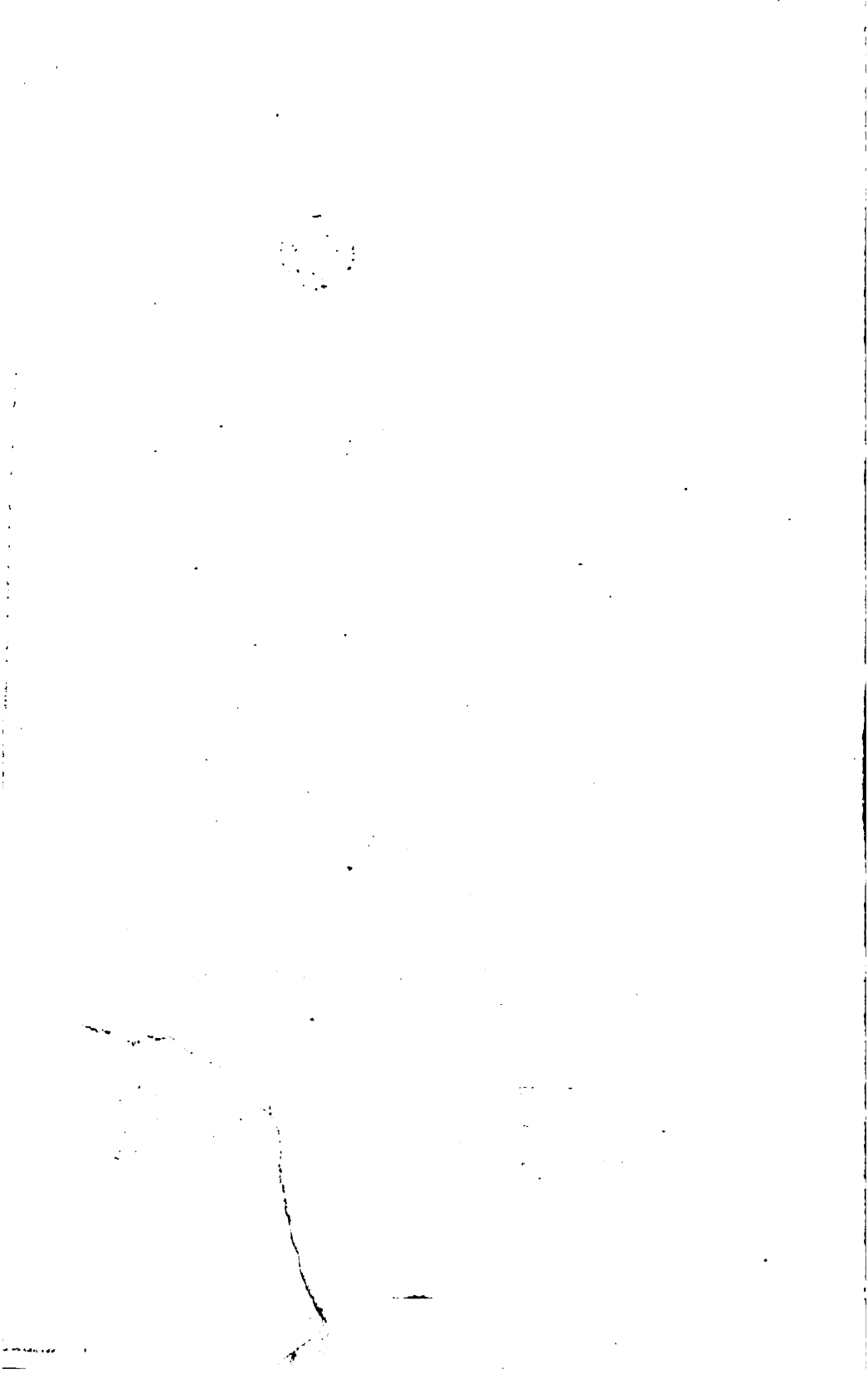


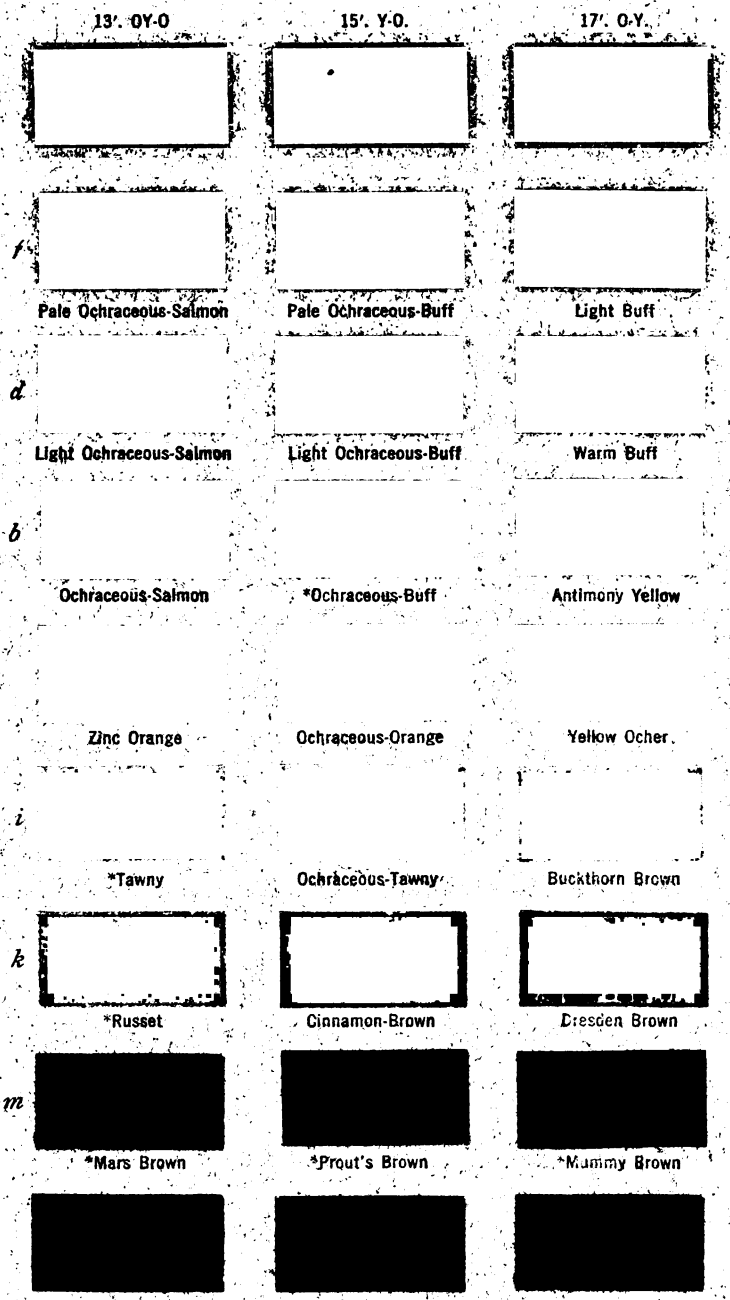
	43. G-B.	45. BG-B.	47. G-BB.
			
f	 Beryt Blue	 *Pale Blue. (Ethyl Blue)	 Pallid Methyl Blue
d	 Calamine Blue	 Pale Cerulean Blue	 Pale Methyl Blue
b	Cendre Blue	Light Cerulean Blue	Light Methyl Blue
	 Italian Blue	 *Cerulean Blue	 Methyl Blue
i	 Peacock Blue	 Oxide Blue	 Leitch's Blue
k	 Patent Blue	 *Antwerp Blue	 *Paris Blue
m	 Blackish Green-Blue	 *Marine Blue	 *Berlin Blue
			

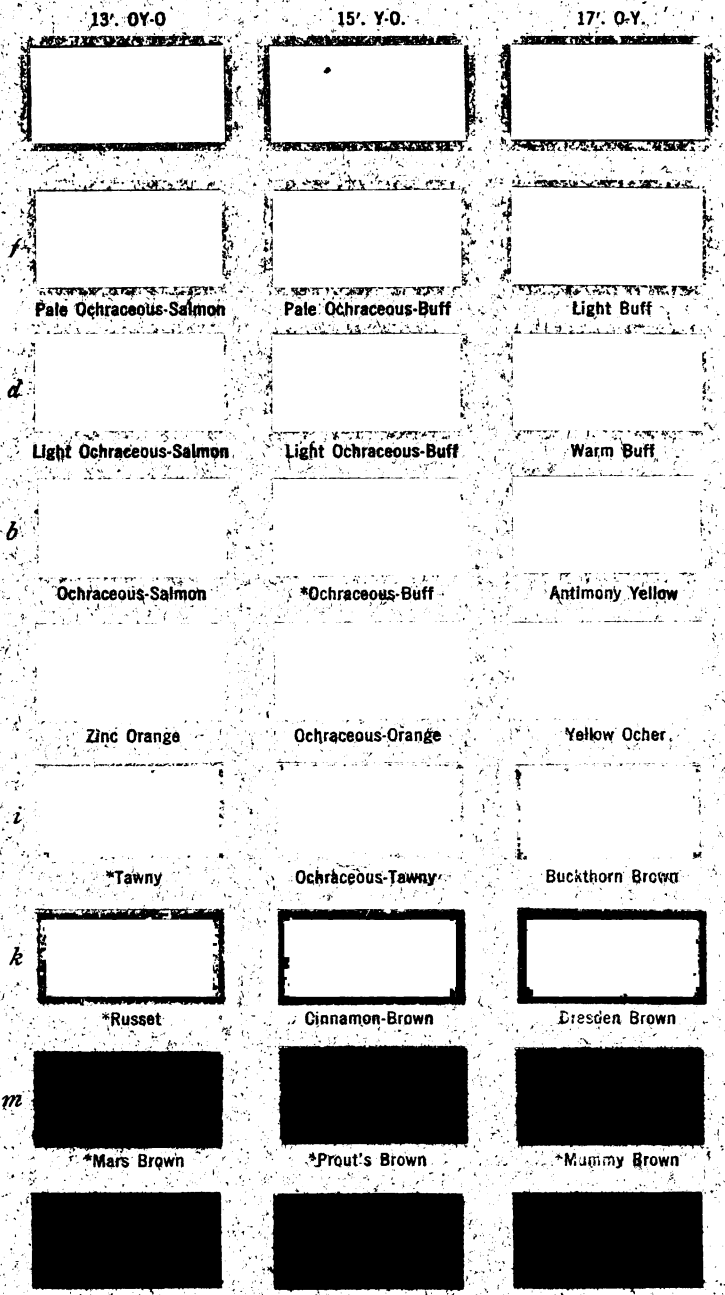

49. BLUE
51. BV-B.
53. V-B.
f
Pale Mazarine Blue
Pale Amparo Blue
Pallid Violet-Blue
d
Mazarine Blue
Light Amparo Blue
Pale Violet-Blue
b
Salvia Blue
Amparo Blue
Light Violet-Blue
Spectrum Blue
Bradley's Blue
Phenyl Blue
i
*Ultramarine Blue
Lyons Blue
*Smalt Blue
k
Rood's Blue
Helvetia Blue
Hay's Blue
m
Prussian Blue
*Cyanine Blue
Azurite Blue

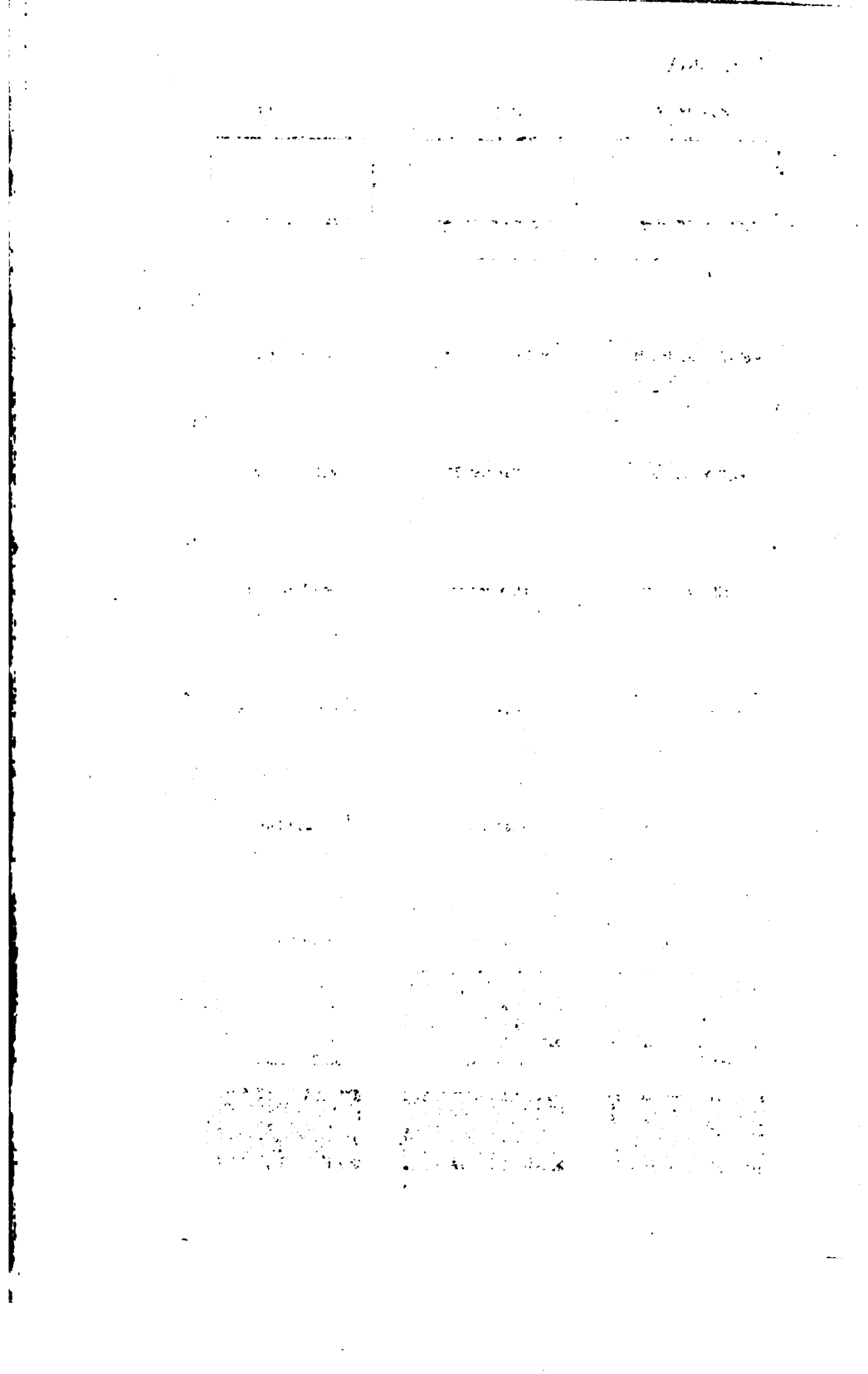

7'. R-O.
9'. OR-O.
11'. ORANGE
f
Pale Flesh Color
Pale Salmon Color
Seashell Pink
d
*Flesh Color
*Salmon Color
*Salmon-Buff
b
Carrot Red
Flesh-Ocher
Apricot Buff
Carnelian Red
*Rufous
Apricot Orange
i
*Vinaceous-Rufous
*Ferruginous
*Cinnamon-Rufous
k
Hay's Russet
Kaiser Brown
*Hazel
m
*Liver Brown
Carob Brown
Chestnut-Brown



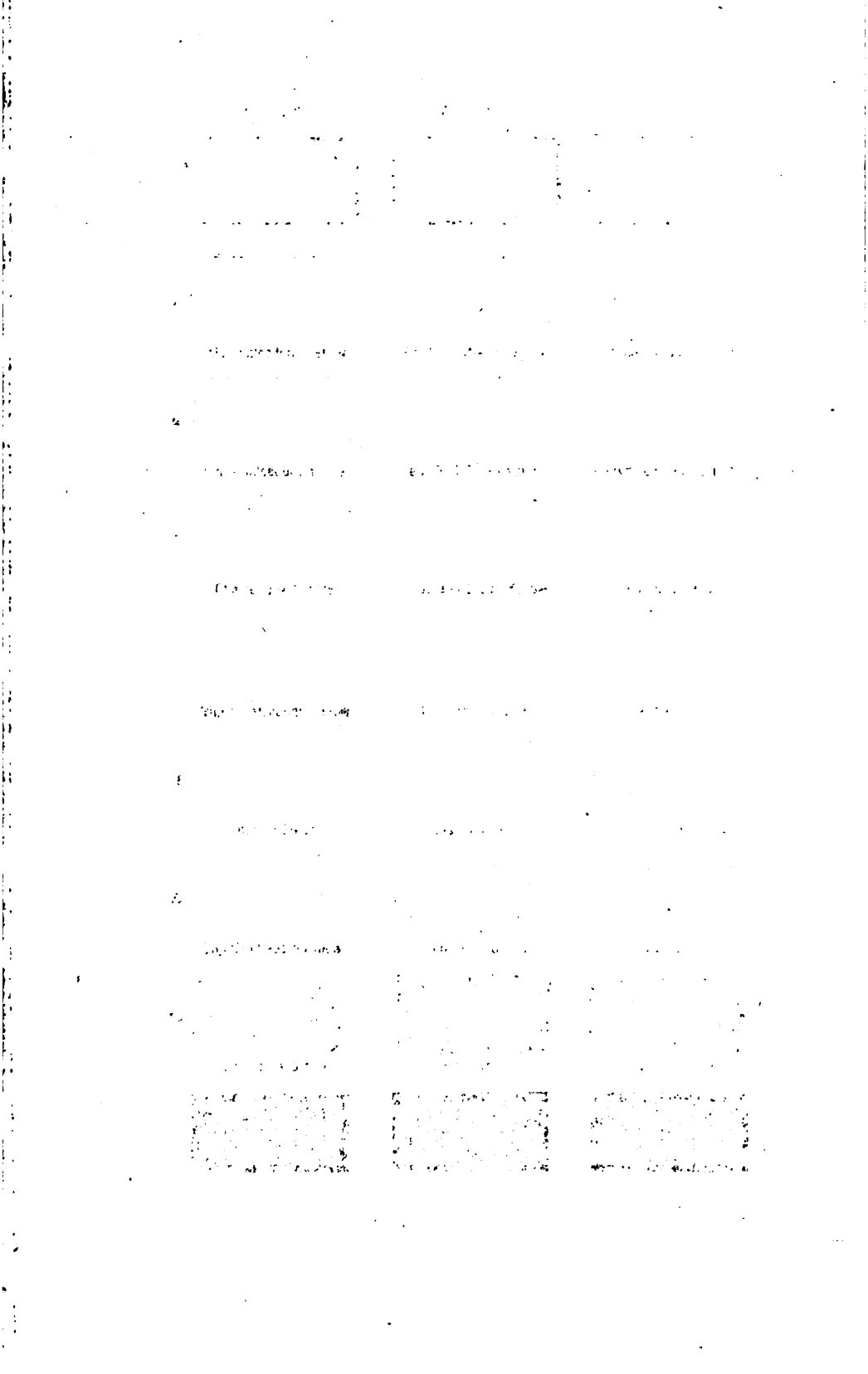


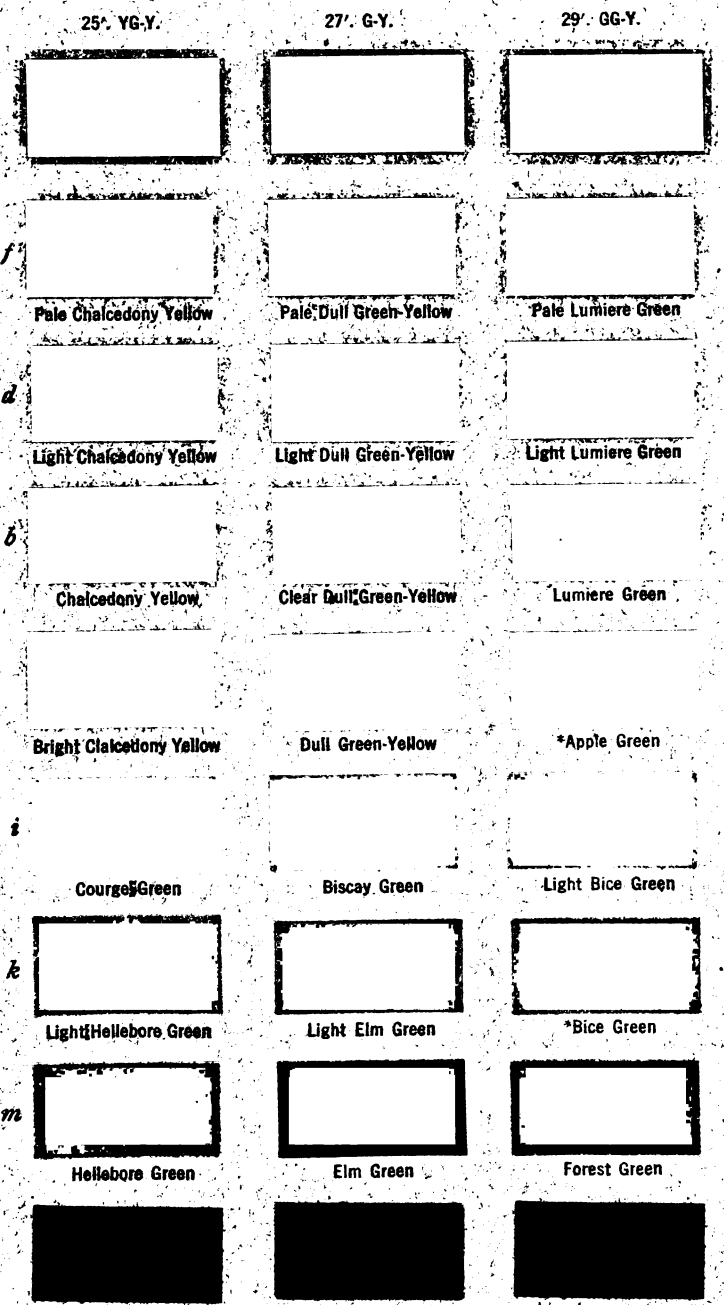

13′. OY-O
15′. Y-O.
17′. O-Y.
f
Pale Ochraceous-Salmon
Pale Ochraceous-Buff
Light Buff
d
Light Ochraceous-Salmon
Light Ochraceous-Buff
Warm Buff
b
Ochraceous-Salmon
*Ochraceous-Buff
Antimony Yellow
Zinc Orange
Ochraceous-Orange
Yellow Ocher
i
*Tawny
Ochraceous-Tawny
Buckthorn Brown
k
*Russet
Cinnamon-Brown
Dresden Brown
m
*Mars Brown
*Prout's Brown
*Mummy Brown

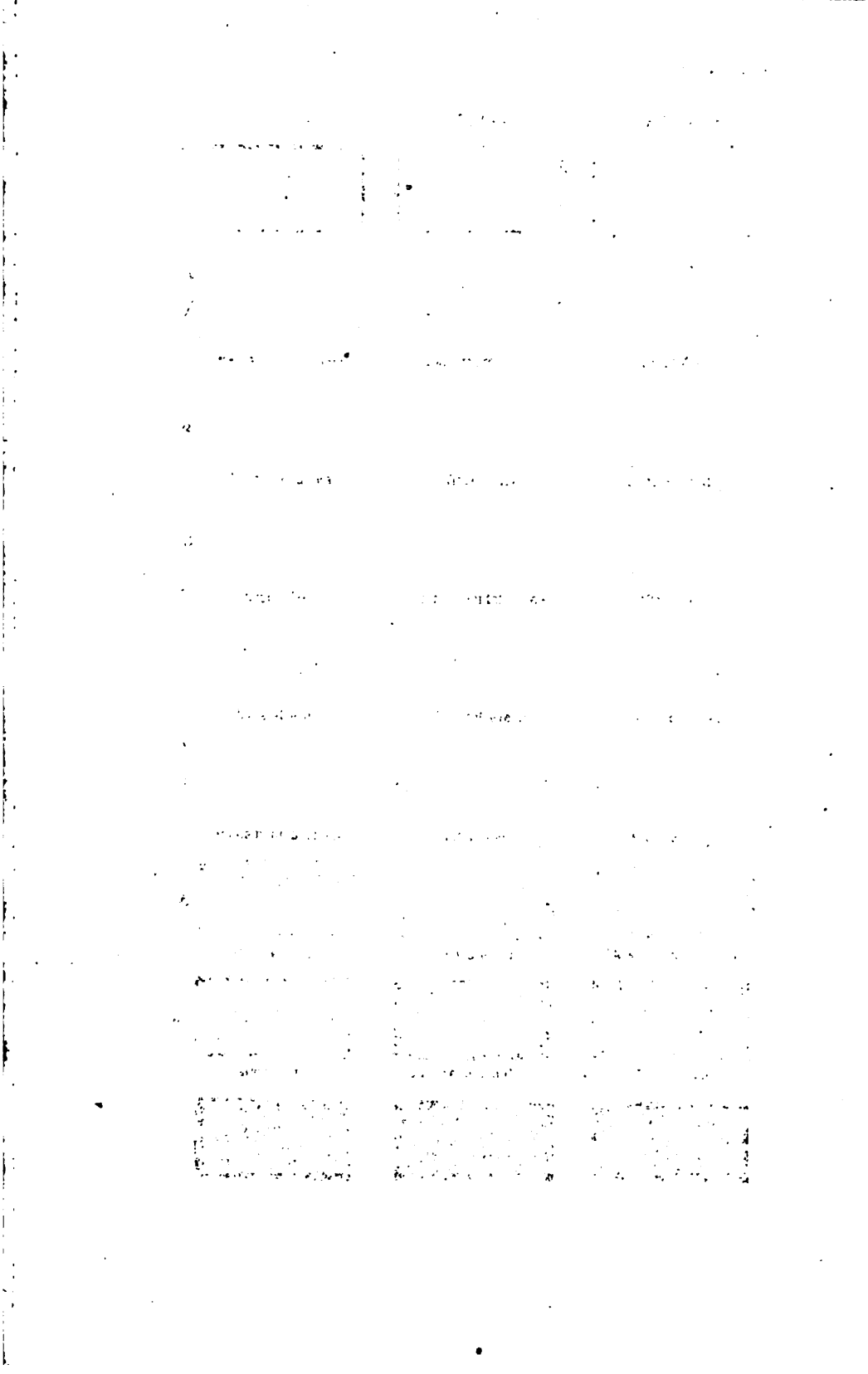

13'. OY-O
15'. Y-O.
17'. O-Y.
f
Pale Ochraceous-Salmon
Pale Ochraceous-Buff
Light Buff
d
Light Ochraceous-Salmon
Light Ochraceous-Buff
Warm Buff
b
Ochraceous-Salmon
*Ochraceous-Buff
Antimony Yellow
Zinc Orange
Ochraceous-Orange
Yellow Ocher
i
*Tawny
Ochraceous-Tawny
Buckthorn Brown
k
*Russet
Cinnamon-Brown
Dresden Brown
m
*Mars Brown
*Prout's Brown
*Mummy Brown

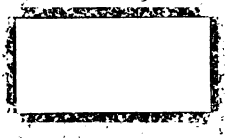
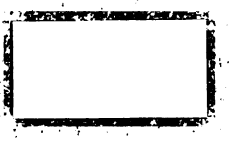
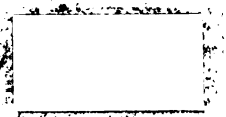
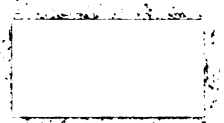
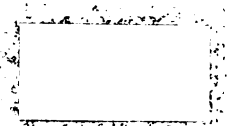
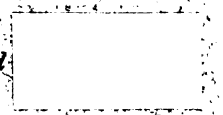
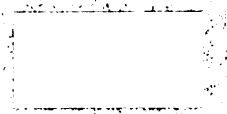
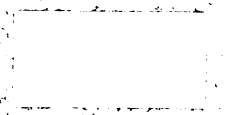
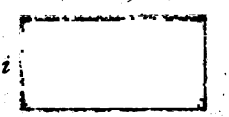
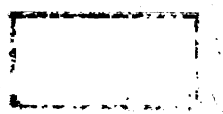
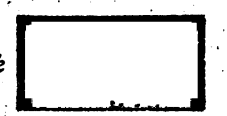
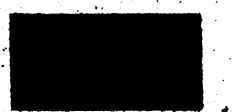
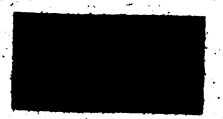
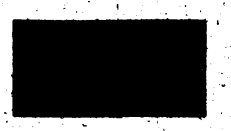


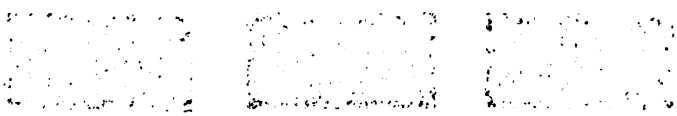
	19'. YO-Y.	21'. O-YY.	23'. YELLOW
f	*Cream Color	Massicot Yellow	Naphthaleine Yellow
d	*Naples Yellow	*Straw Yellow	Barium Yellow
b	Mustard Yellow	Amber Yellow	*Citron Yellow
	Primuline Yellow	*Wax Yellow	Strontian Yellow
i	Old Gold	Olive Lake	Yellowish Citrine
k	Buffy Citrine	Dull Citrine	Serpentine Green
m	Saccardo's Olive	Olive-Citrine	Roman Green

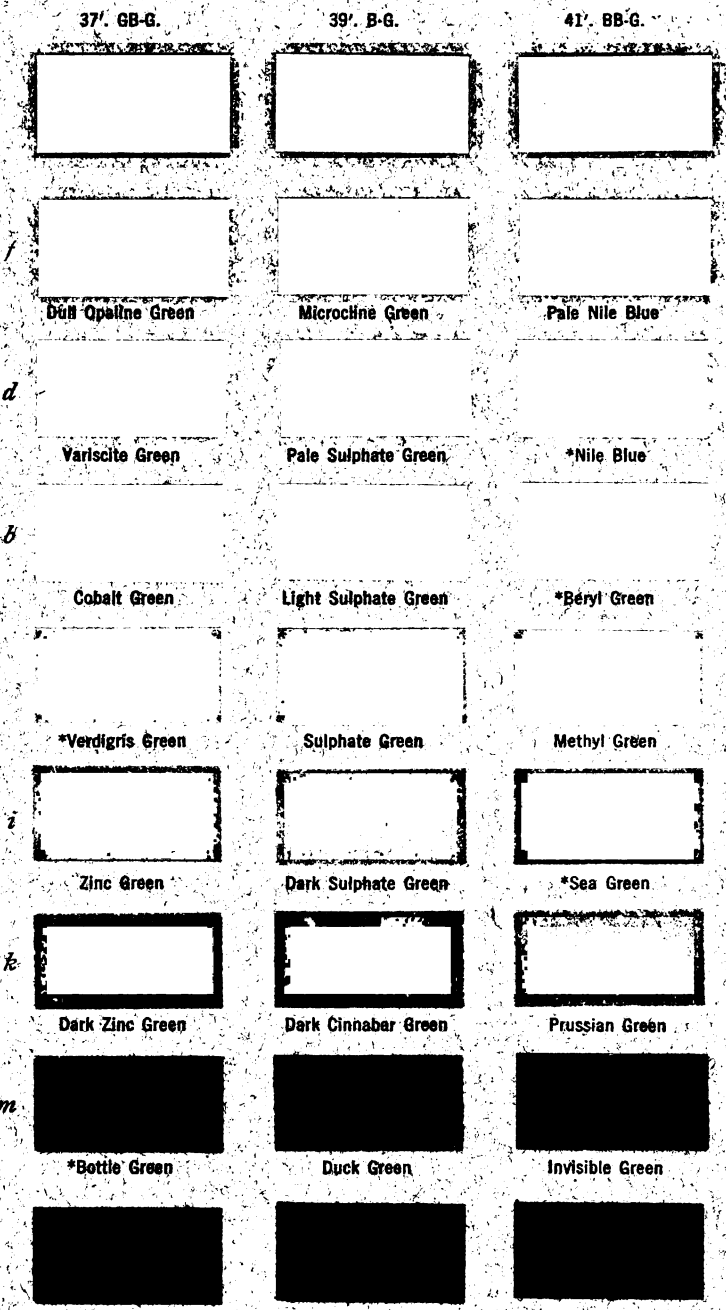


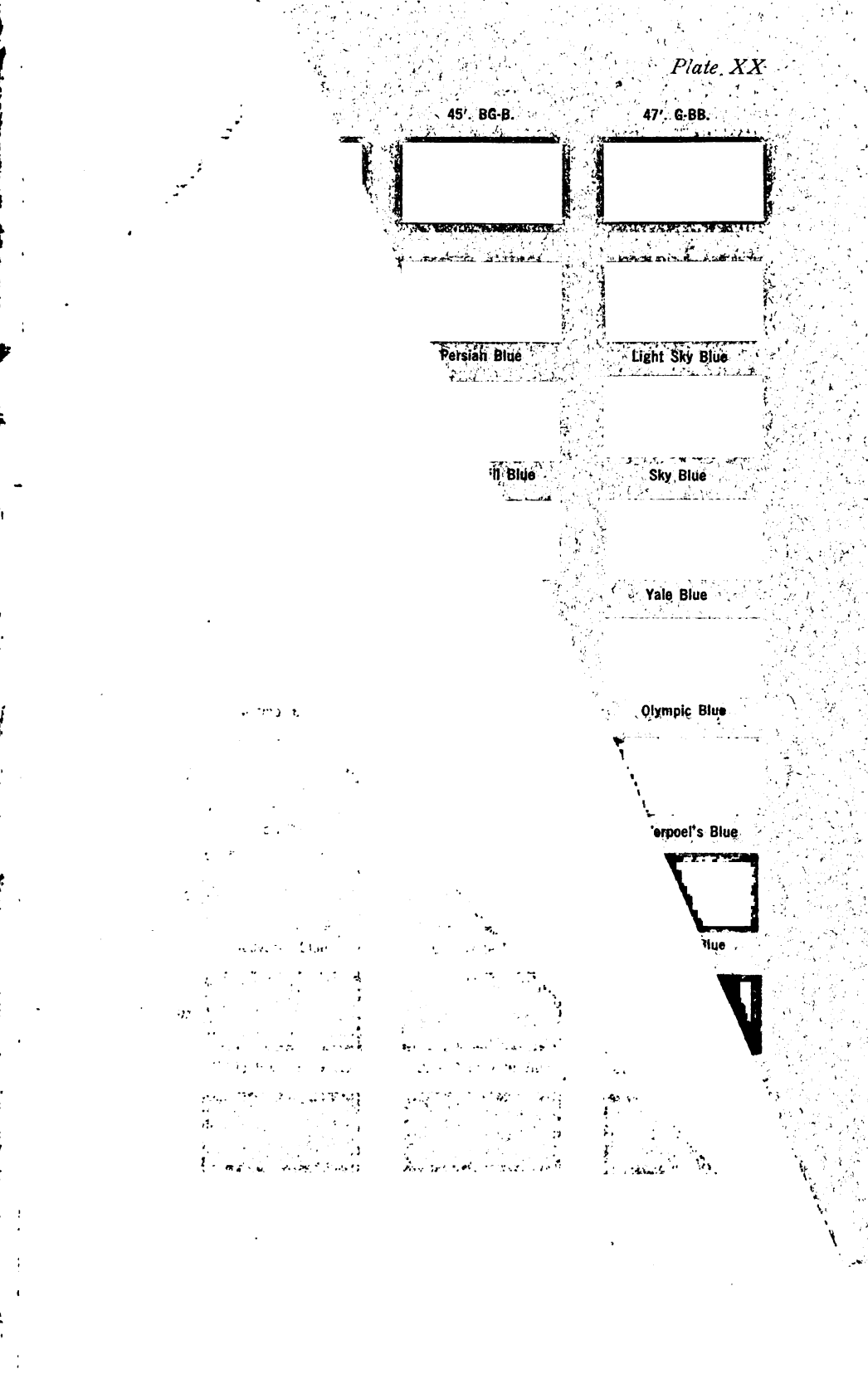

25°. YG-Y.
27°. G-Y.
29°. GG-Y.
f
Pale Chalcedony Yellow
Pale Dull Green-Yellow
Pale Lumiere Green
d
Light Chalcedony Yellow
Light Dull Green-Yellow
Light Lumiere Green
b
Chalcedony Yellow
Clear Dull Green-Yellow
Lumiere Green
Bright Chalcedony Yellow
Dull Green-Yellow
*Apple Green
i
Courge Green
Biscay Green
Light Bice Green
k
Light Hellebore Green
Light Elm Green
*Bice Green
m
Hellebore Green
Elm Green
Forest Green

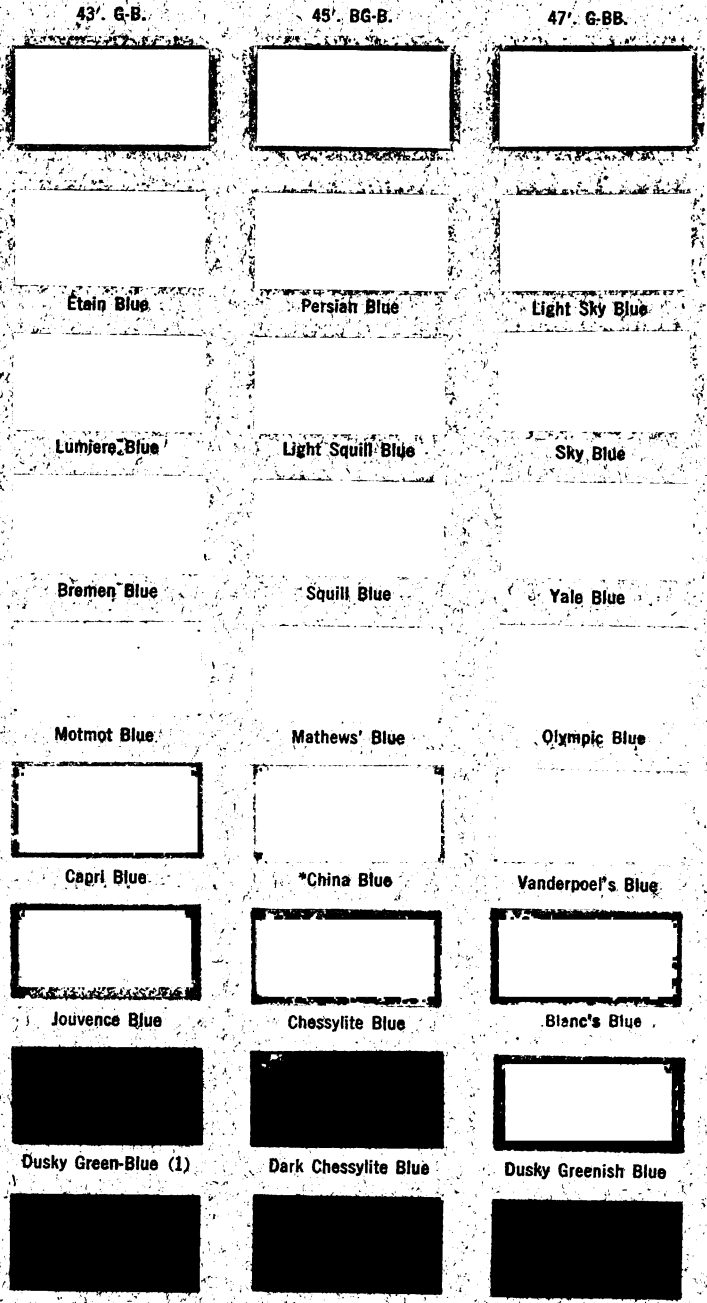


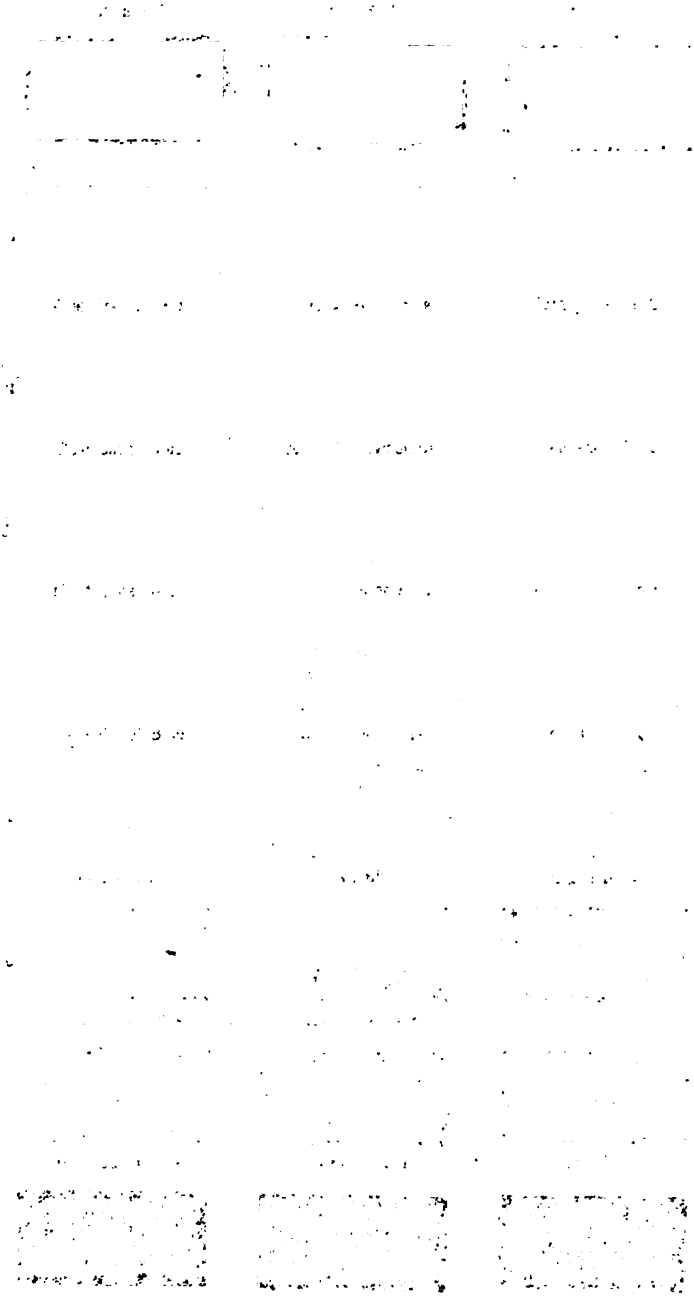
	31′. Y-G.	33′. GY-G.	35′. GREEN
			
f	 Pale Veronese Green	 Pale Tiber Green	 Oural Green
d	 Veronese Green	 Tiber Green	 Light Paris Green
b	 Rivage Green	 Light Oriental Green	 *Paris Green
	Mineral Green	Oriental Green	Motmot Green
i	 Rinnemann's Green	 Winter Green	 Killarney Green
k	 Civette Green	 Hay's Green	 Ackermann's Green
m	 Varley's Green	 Dark Yellowish Green	 Dark Green
			

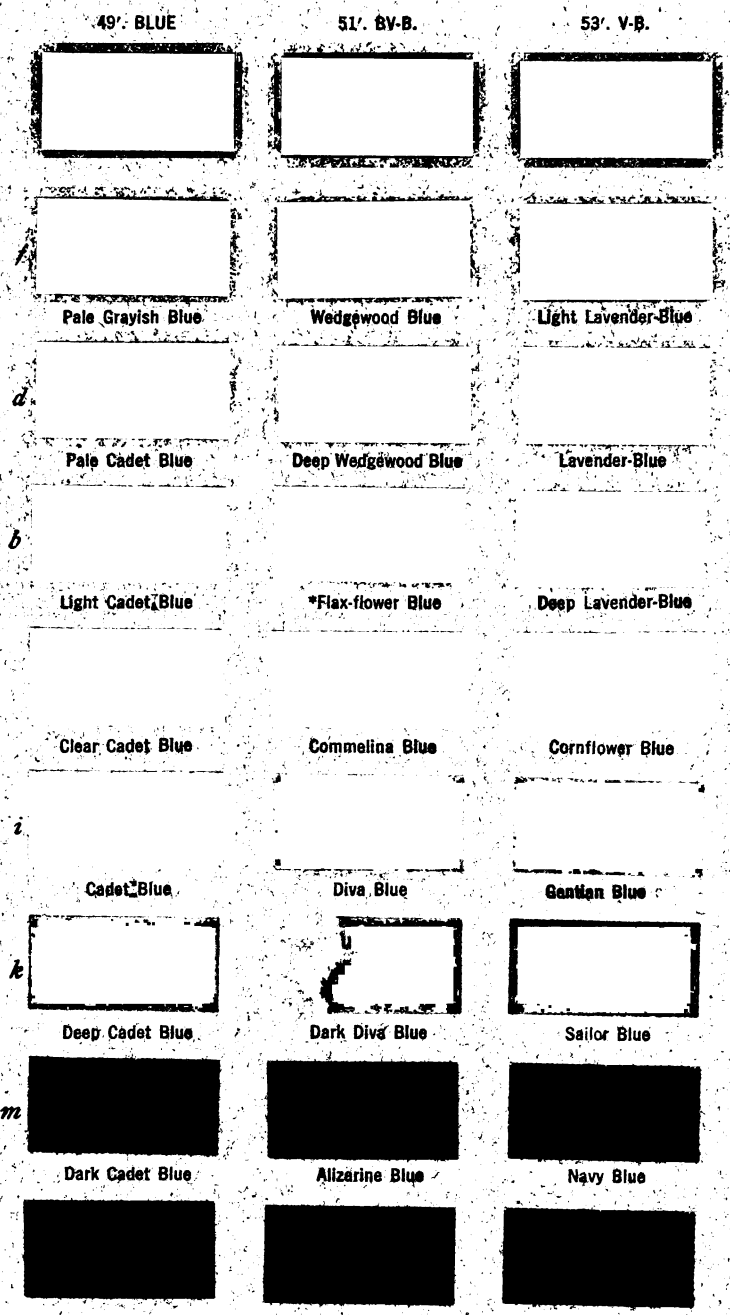


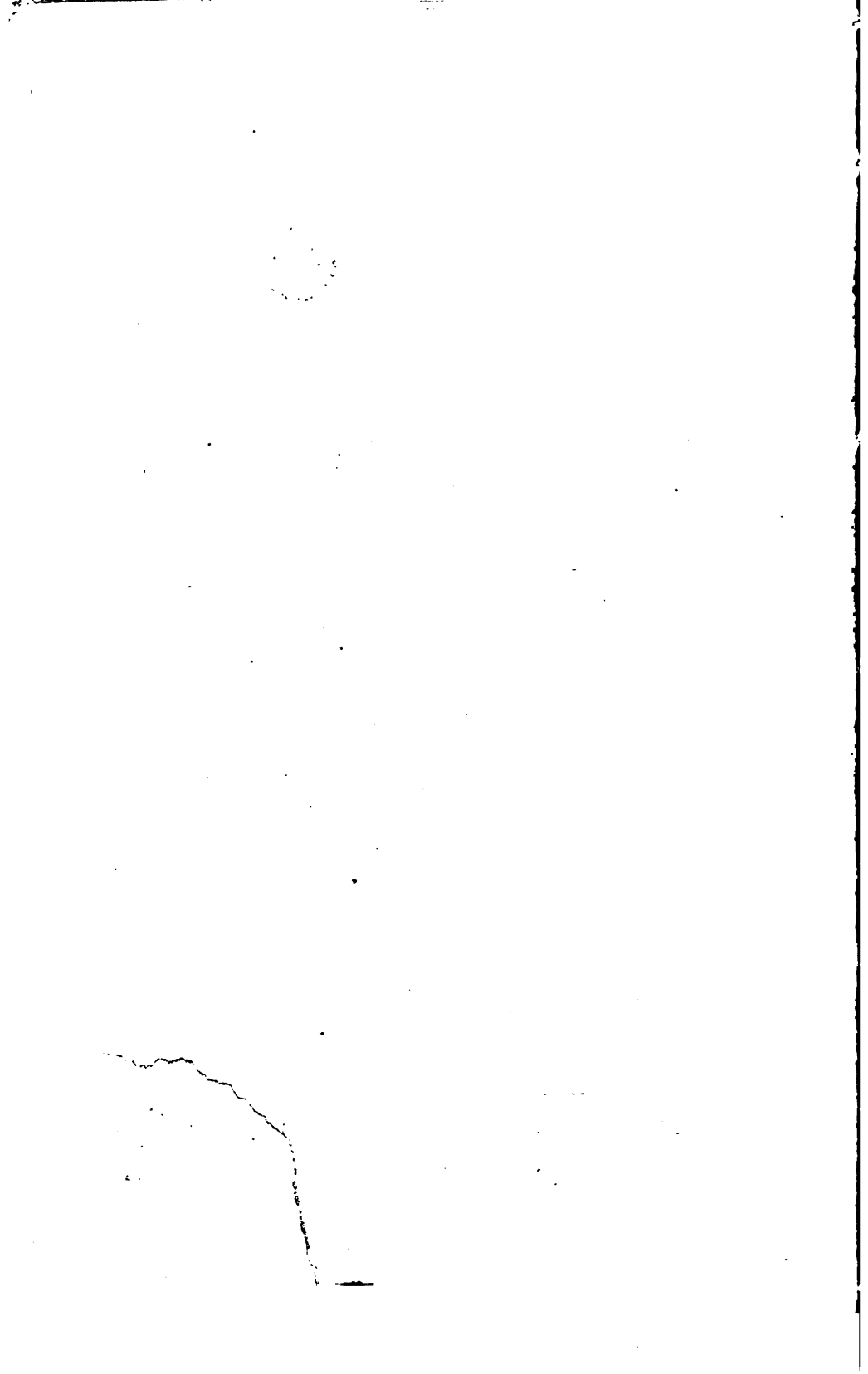

37'. GB-G.
39'. B-G.
41'. BB-G.
f
Dull Opaline Green
Microcline Green
Pale Nile Blue
d
Variscite Green
Pale Sulphate Green
*Nile Blue
b
Cobalt Green
Light Sulphate Green
*Beryl Green
*Verdigris Green
Sulphate Green
Methyl Green
i
Zinc Green
Dark Sulphate Green
*Sea Green
k
Dark Zinc Green
Dark Cinnabar Green
Prussian Green
m
*Bottle Green
Duck Green
Invisible Green

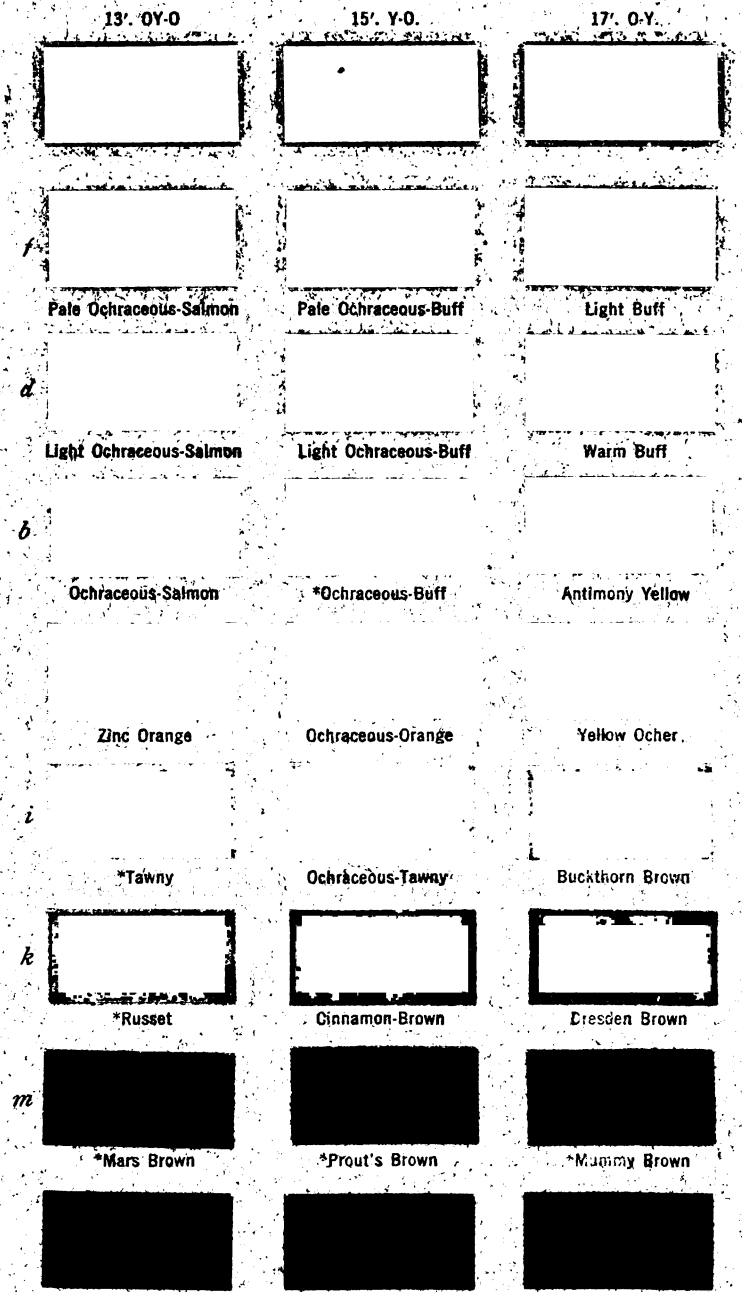

45'. BG-B.
47'. G-BB.
Persian Blue
Light Sky Blue
Sky Blue
Yale Blue
Olympic Blue

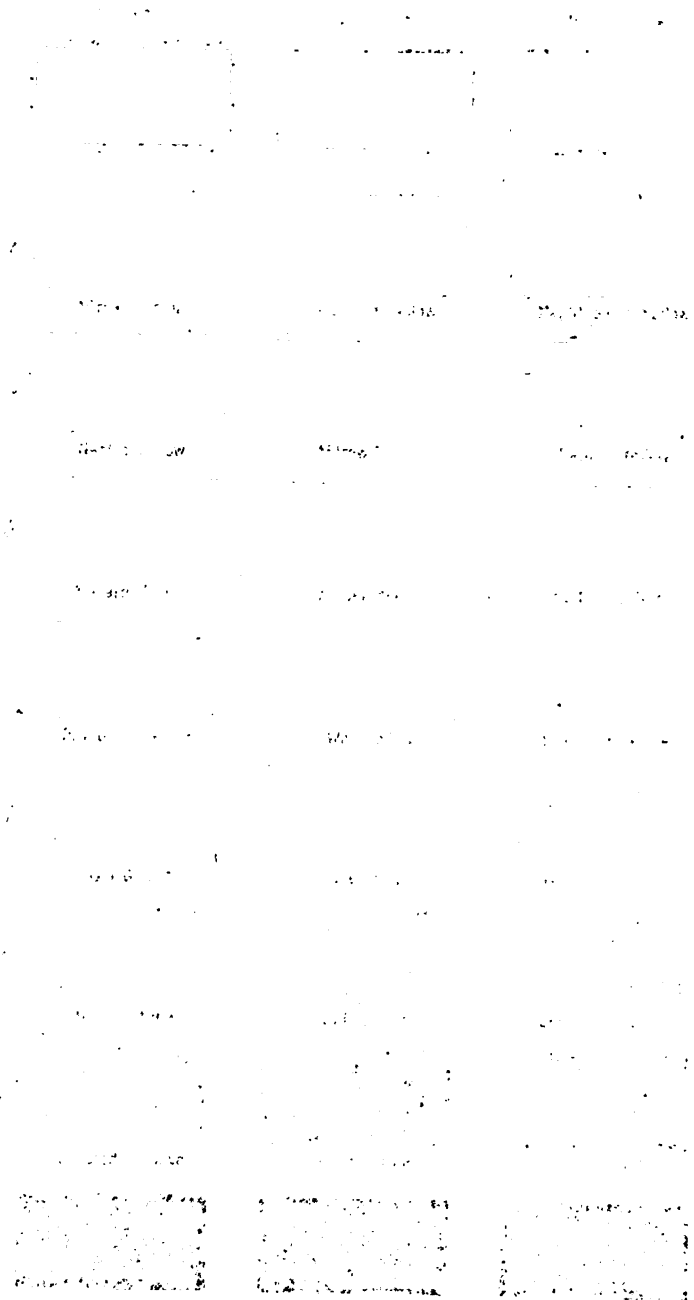

43'. G-B.
45'. BG-B.
47'. G-BB.
f
Etain Blue
Persian Blue
Light Sky Blue
d
Lumiere Blue
Light Squill Blue
Sky Blue
b
Bremen Blue
Squill Blue
Yale Blue
Motmot Blue
Mathews' Blue
Olympic Blue
i
Capri Blue
*China Blue
Vanderpoel's Blue
k
Jouvence Blue
Chessylite Blue
Blanc's Blue
m
Dusky Green-Blue (1)
Dark Chessylite Blue
Dusky Greenish Blue

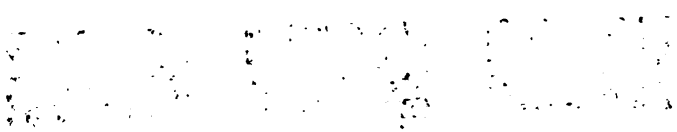



49′. BLUE
51′. BV-B.
53′. V-β.
f
Pale Grayish Blue
Wedgewood Blue
Light Lavender-Blue
d
Pale Cadet Blue
Deep Wedgewood Blue
Lavender-Blue
b
Light Cadet Blue
*Flax-flower Blue
Deep Lavender-Blue
Clear Cadet Blue
Commelina Blue
Cornflower Blue
i
Cadet Blue
Diva Blue
Gentian Blue
k
Deep Cadet Blue
Dark Diva Blue
Sailor Blue
m
Dark Cadet Blue
Alizarine Blue
Navy Blue

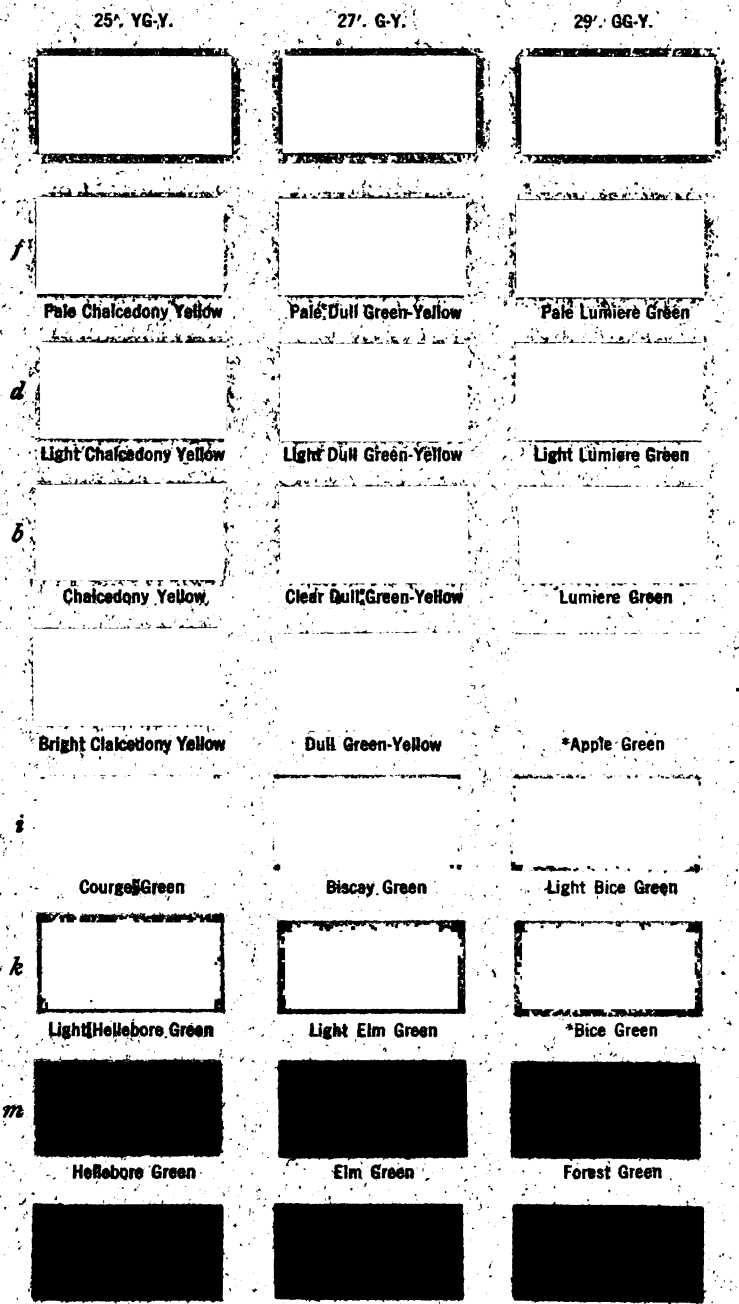


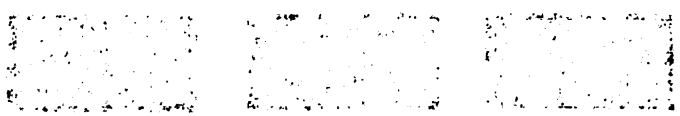

13'. OY-O
15'. Y-O.
17'. O-Y.
f
Pale Ochraceous-Salmon
Pale Ochraceous-Buff
Light Buff
d
Light Ochraceous-Salmon
Light Ochraceous-Buff
Warm Buff
b
Ochraceous-Salmon
*Ochraceous-Buff
Antimony Yellow
Zinc Orange
Ochraceous-Orange
Yellow Ocher
i
*Tawny
Ochraceous-Tawny
Buckthorn Brown
k
*Russet
Cinnamon-Brown
Dresden Brown
m
*Mars Brown
*Prout's Brown
*Mummy Brown



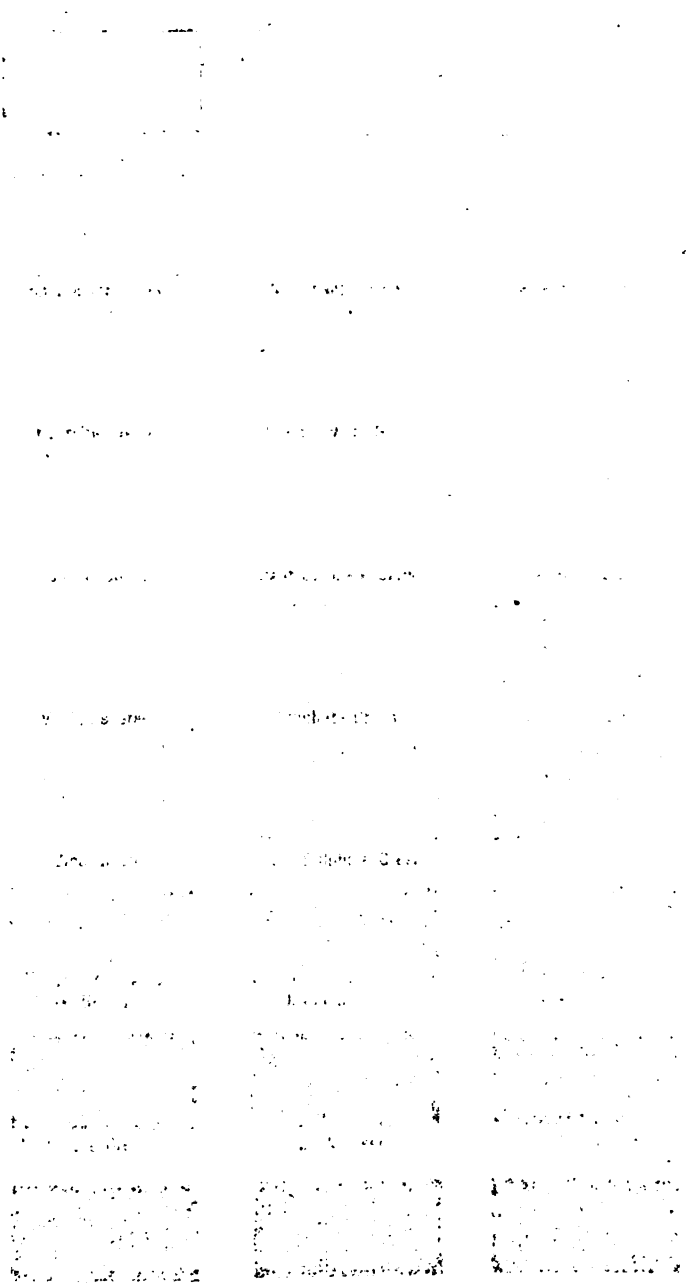


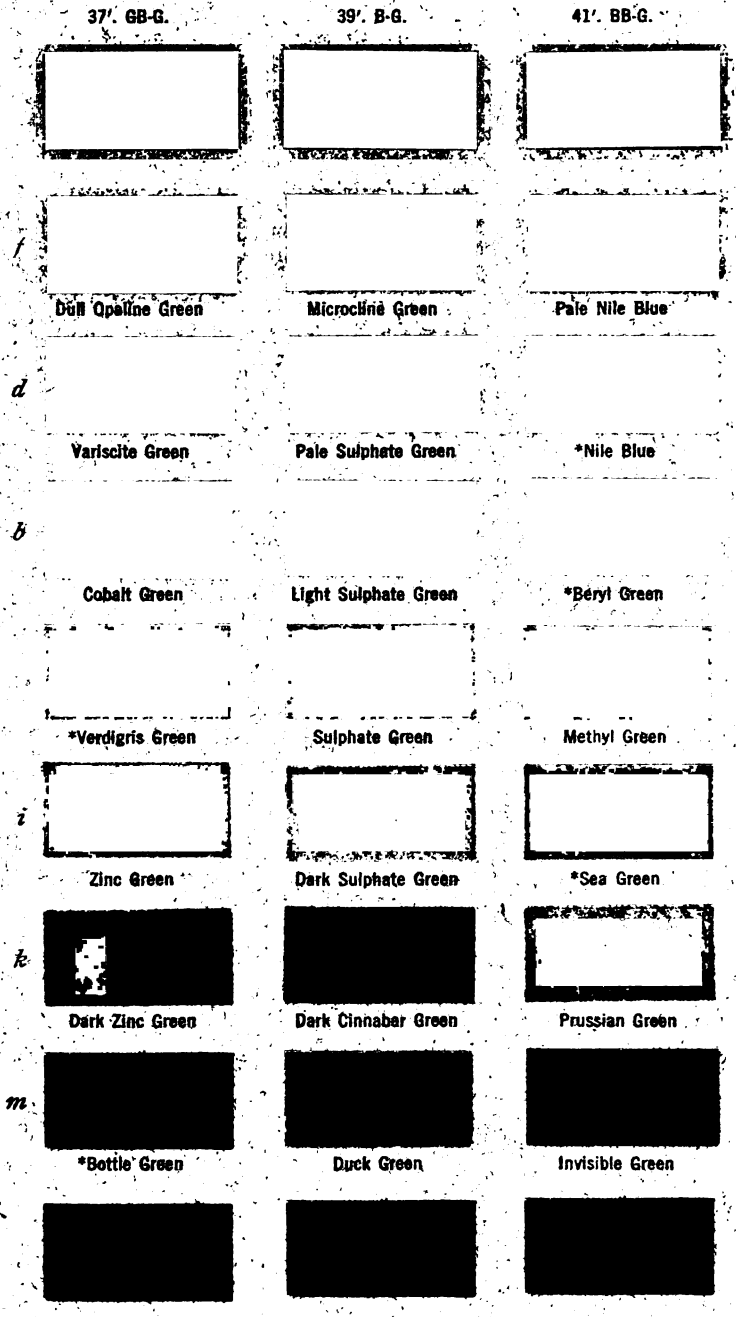

19'. YO-Y.
21'. O-YY.
23'. YELLOW
f
*Cream Color
Massicot Yellow
Naphthalene Yellow
d
*Naples Yellow
*Straw Yellow
Barium Yellow
b
Mustard Yellow
Amber Yellow
*Citron Yellow
Primuline Yellow
*Wax Yellow
Strontian Yellow
i
Old Gold
Olive Lake
Yellowish Citrine
k
Buffy Citrine
Dull Citrine
Serpentine Green
m
Saccardo's Olive
Olive-Citrine
Roman Green


25'. YG-Y.
27'. G-Y.
29'. GG-Y.
f
Pale Chalcedony Yellow
Pale Dull Green-Yellow
Pale Lumiere Green
d
Light Chalcedony Yellow
Light Dull Green-Yellow
Light Lumiere Green
b
Chalcedony Yellow
Clear Dull Green-Yellow
Lumiere Green
Bright Chalcedony Yellow
Dull Green-Yellow
*Apple Green
i
Courge Green
Biscay Green
Light Bice Green
k
Light Hellebore Green
Light Elm Green
*Bice Green
m
Hellebore Green
Elm Green
Forest Green

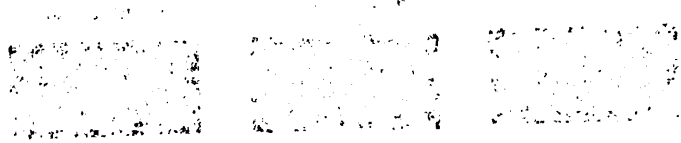


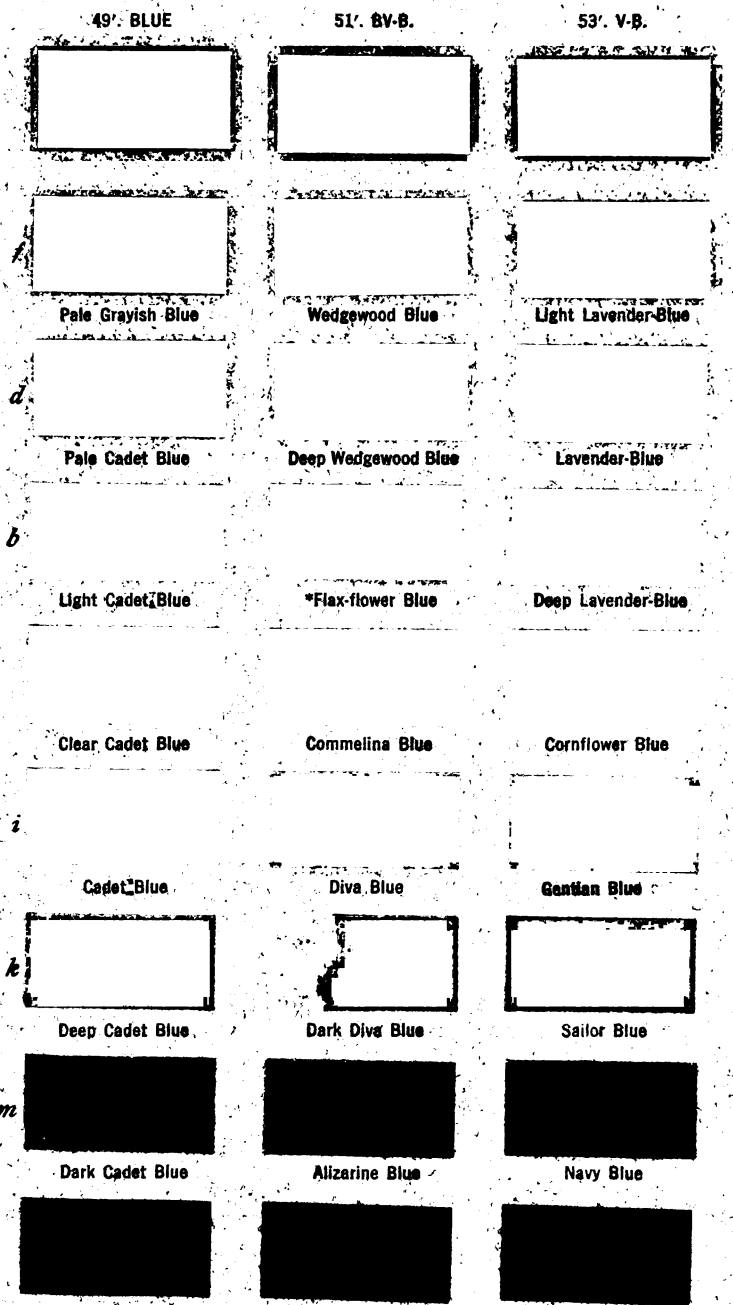
	31′. Y-G.	33′. GY-G.	35′. GREEN
f	Pale Veronese Green	Pale Tiber Green	Oural Green
d	Veronese Green	Tiber Green	Light Paris Green
b	Rivage Green	Light Oriental Green	*Paris Green
	Mineral Green	Oriental Green	Motmot Green
i	Rinnemann's Green	Winter Green	Killarney Green
k	Civette Green	Hay's Green	Ackermann's Green
m	Varley's Green	Dark Yellowish Green	Dark Green

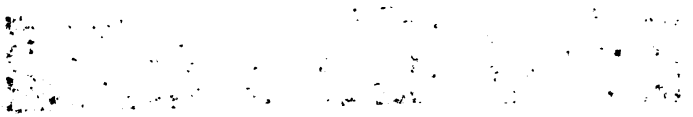


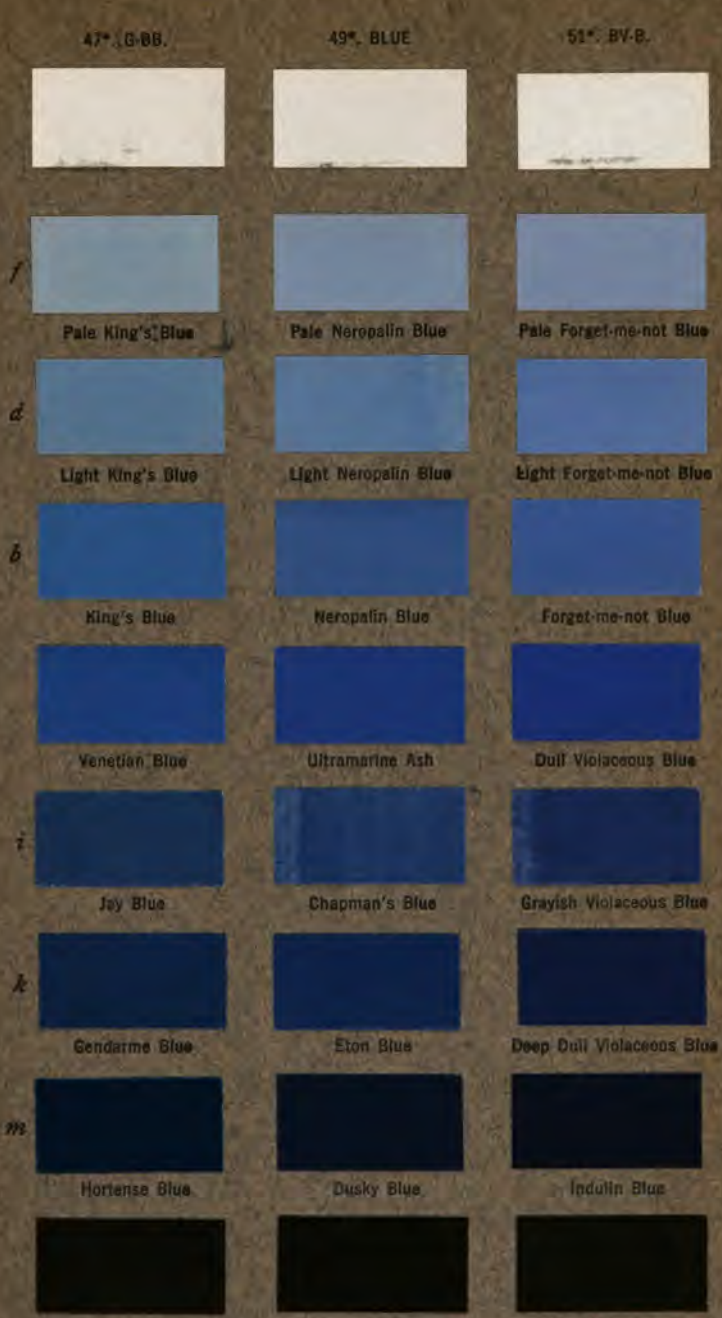

37′. GB-G.
39′. B-G.
41′. BB-G.
f
Dull Opaline Green
Microcline Green
Pale Nile Blue
d
Variscite Green
Pale Sulphate Green
*Nile Blue
b
Cobalt Green
Light Sulphate Green
*Beryl Green
*Verdigris Green
Sulphate Green
Methyl Green
i
Zinc Green
Dark Sulphate Green
*Sea Green
k
Dark Zinc Green
Dark Cinnabar Green
Prussian Green
m
*Bottle Green
Duck Green
Invisible Green

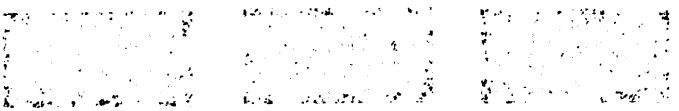
	43′. G-B.	45′. BG-B.	47′. G-BB.
f	Etain Blue	Persian Blue	Light Sky Blue
d	Lumiere Blue	Light Squill Blue	Sky Blue
b	Bremen Blue	Squill Blue	Yale Blue
	Motmot Blue	Mathews' Blue	Olympic Blue
i	Capri Blue	*China Blue	Vanderpoel's Blue
k	Jouvence Blue	Chessylite Blue	Blanc's Blue
m	Dusky Green-Blue (1)	Dark Chessylite Blue	Dusky Greenish Blue



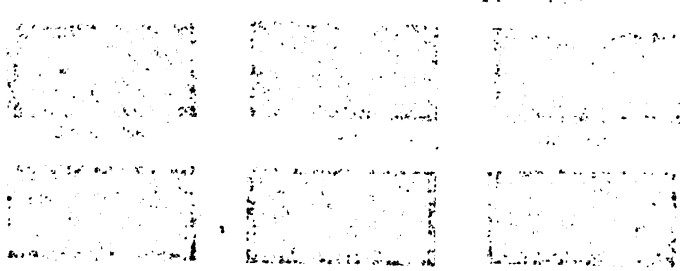

49′. BLUE
51′. BV-B.
53′. V-B.
f
Pale Grayish Blue
Wedgewood Blue
Light Lavender-Blue
d
Pale Cadet Blue
Deep Wedgewood Blue
Lavender-Blue
b
Light Cadet Blue
*Flax-flower Blue
Deep Lavender-Blue
Clear Cadet Blue
Commelina Blue
Cornflower Blue
i
Cadet Blue
Diva Blue
Gentian Blue
k
Deep Cadet Blue
Dark Diva Blue
Sailor Blue
m
Dark Cadet Blue
Alizarine Blue
Navy Blue

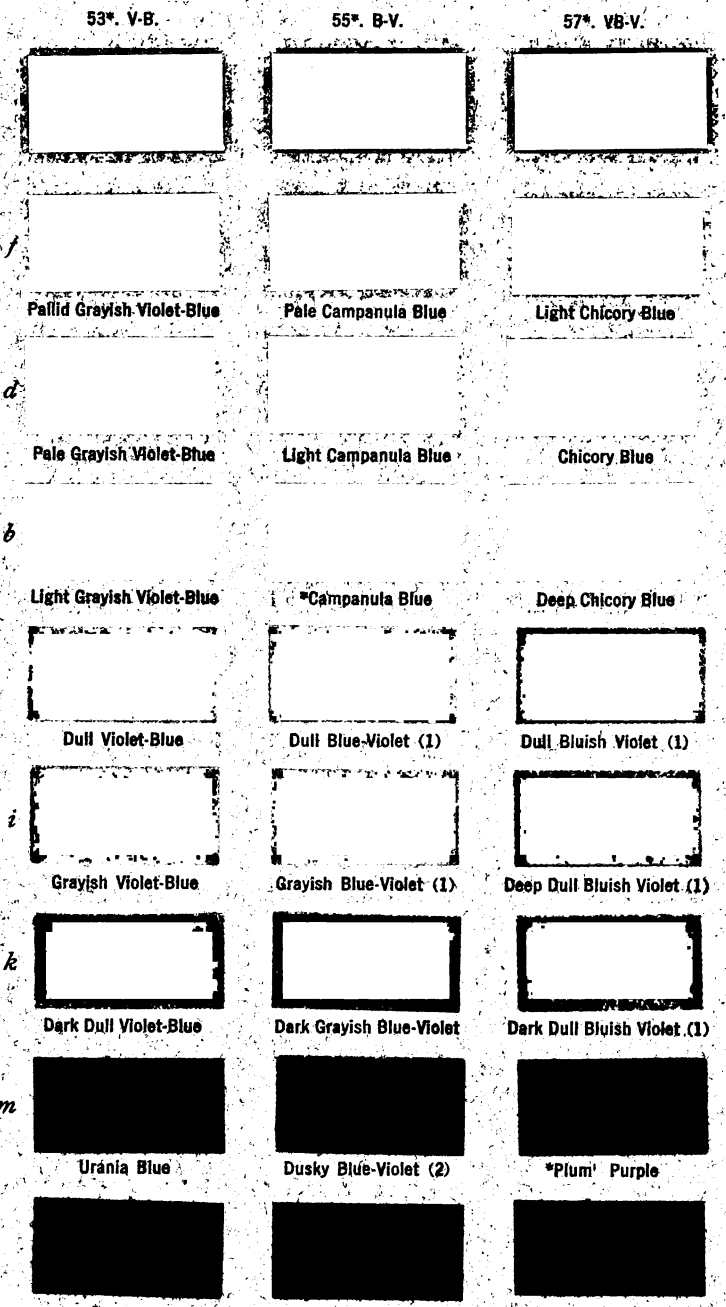


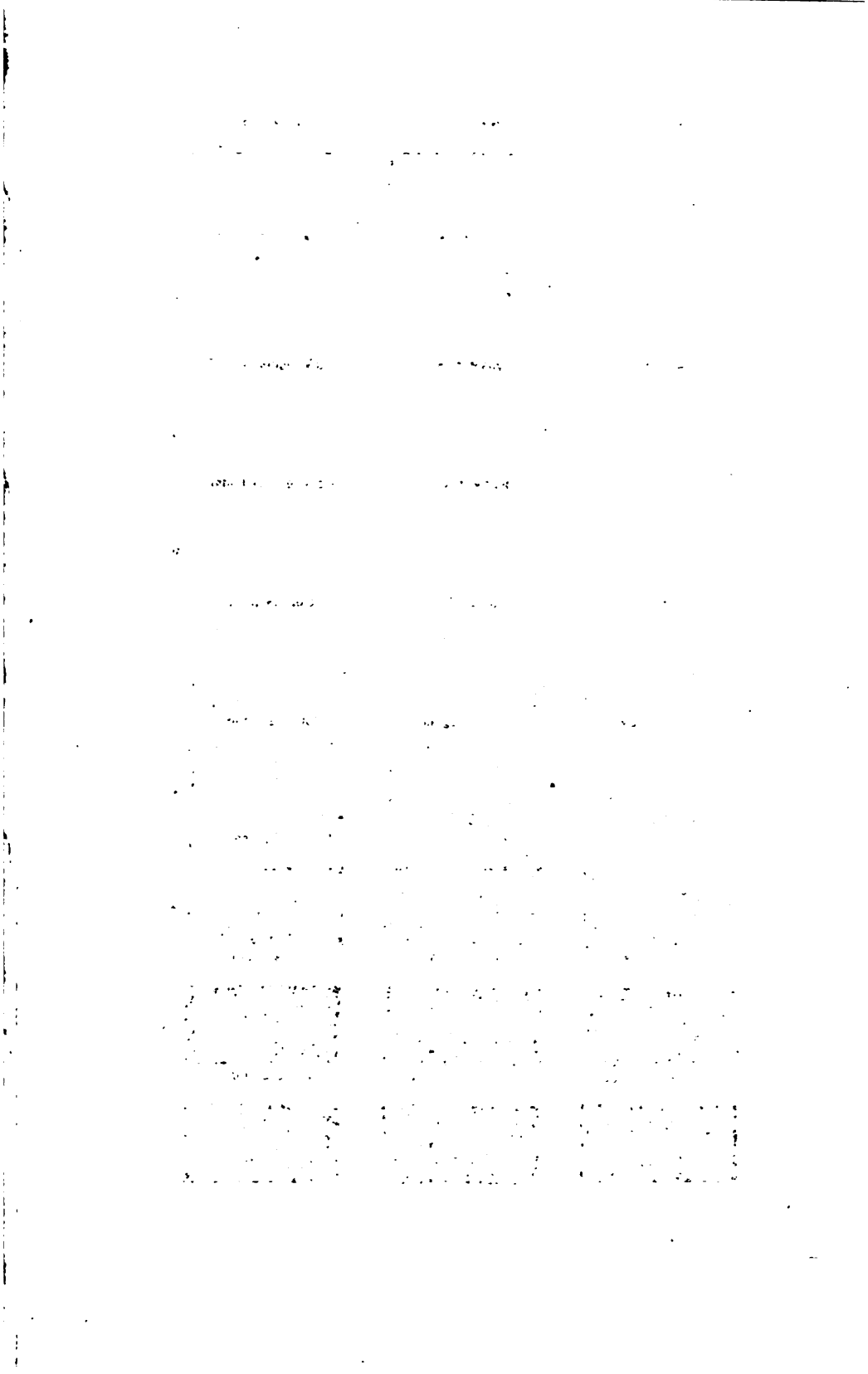

47°. G-BB.
49°. BLUE
51°. BV-B.
f
Pale King's Blue
Pale Neropalin Blue
Pale Forget-me-not Blue
d
Light King's Blue
Light Neropalin Blue
Light Forget-me-not Blue
b
King's Blue
Neropalin Blue
Forget-me-not Blue
Venetian Blue
Ultramarine Ash
Dull Violaceous Blue
i
Jay Blue
Chapman's Blue
Grayish Violaceous Blue
k
Gendarme Blue
Eton Blue
Deep Dull Violaceous Blue
m
Horizon Blue
Dusky Blue
Indulin Blue

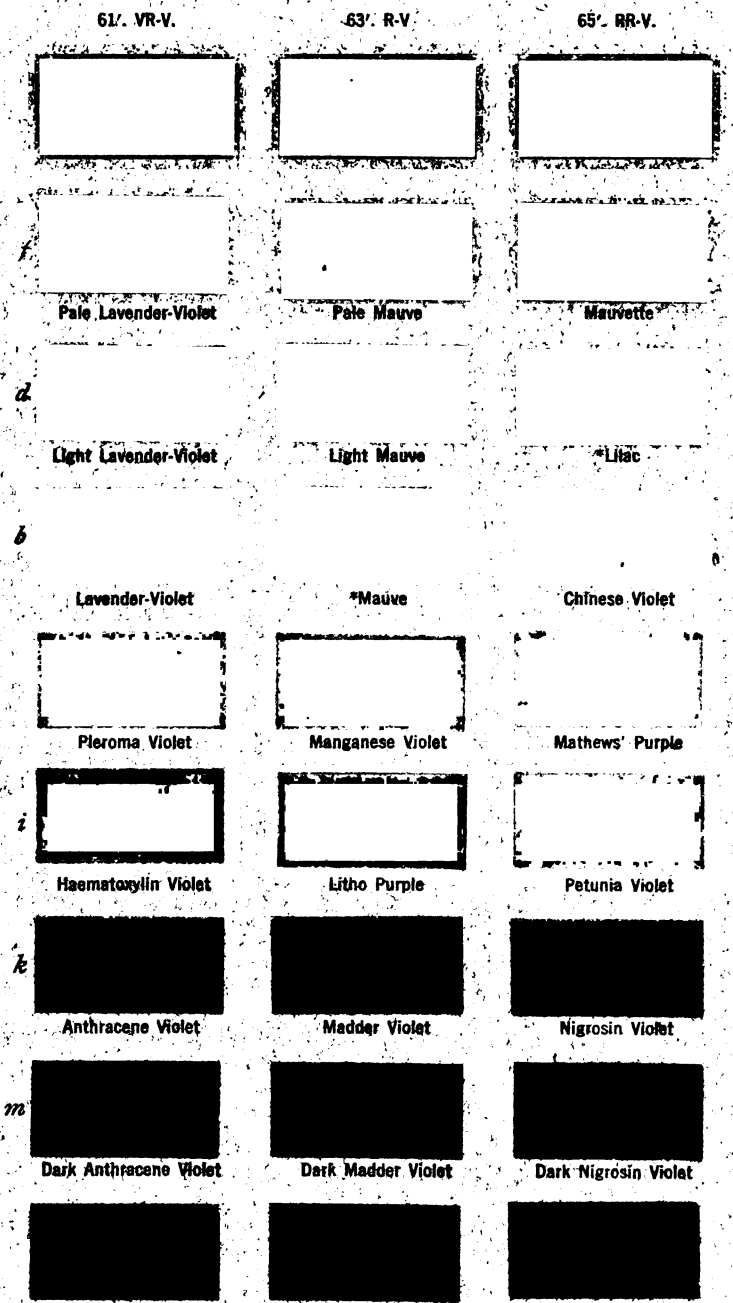


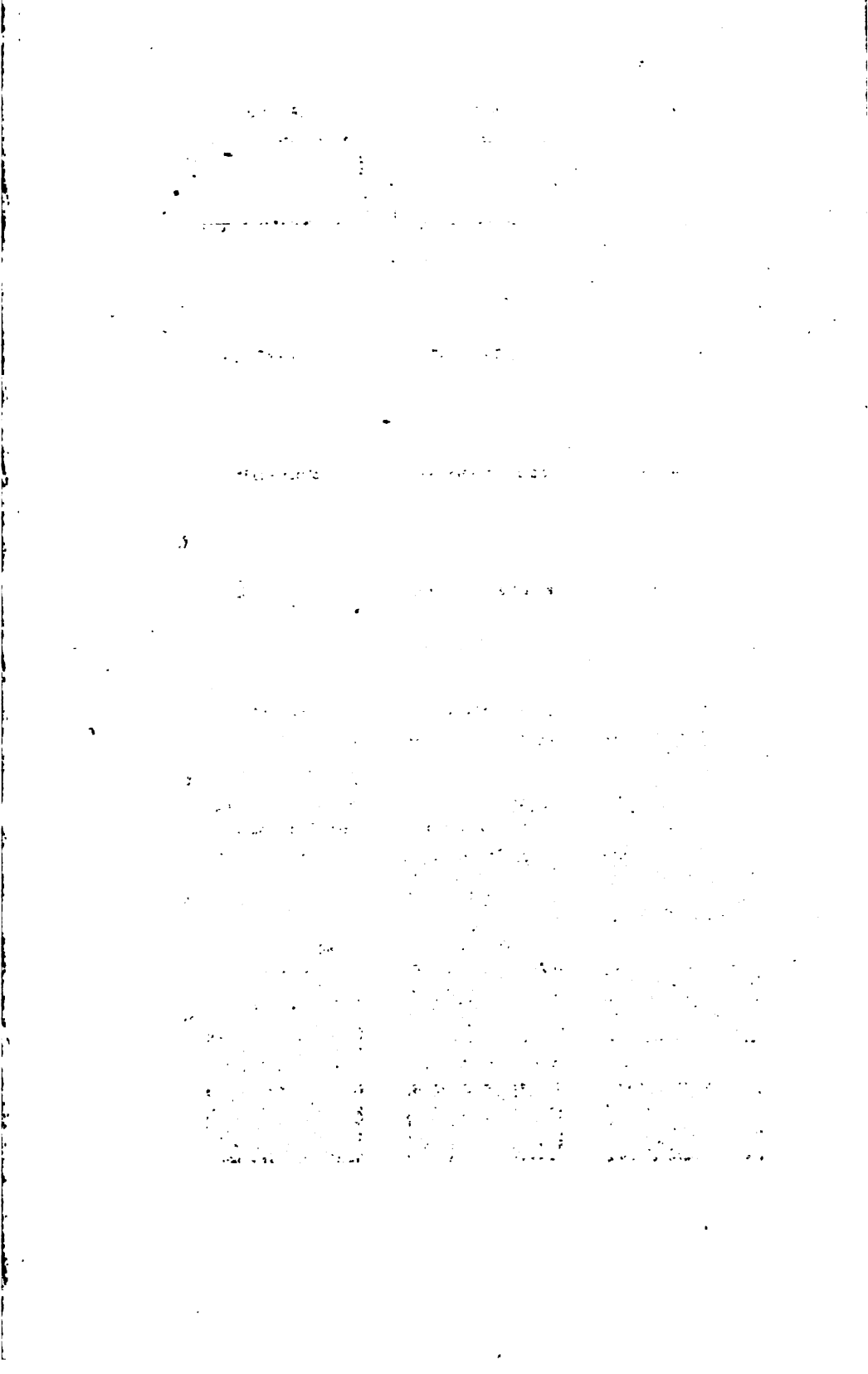
	55′. B-V.	57′. VB-V.	59′. VIOLET
f	Pallid Soft Blue-Violet	Pale Wistaria Blue	Pale Wistaria Violet
d	Pale Soft Blue-Violet	Light Wistaria Blue	Light Wistaria Violet
b	Light Soft Blue-Violet	Wistaria Blue	Wistaria Violet
	Soft Blue-Violet	Soft Bluish Violet	Bradley's Violet
i	Deep Soft Blue-Violet	Deep Soft Bluish Violet	Dauphin's Violet
k	Dark Soft Blue-Violet	Dark Soft Bluish Violet	Blanc's Violet
m	Dusky Violet-Blue (1)	Dusky Blue-Violet (1)	Dusky Violet

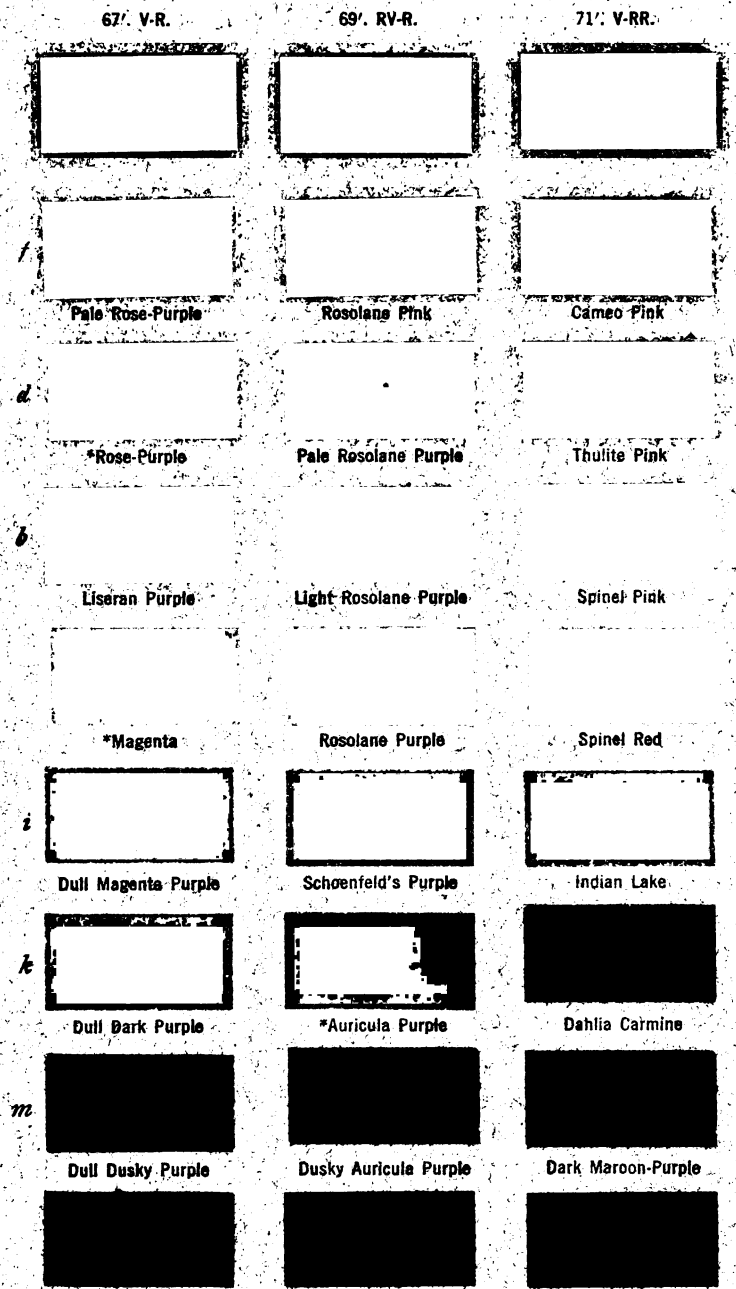


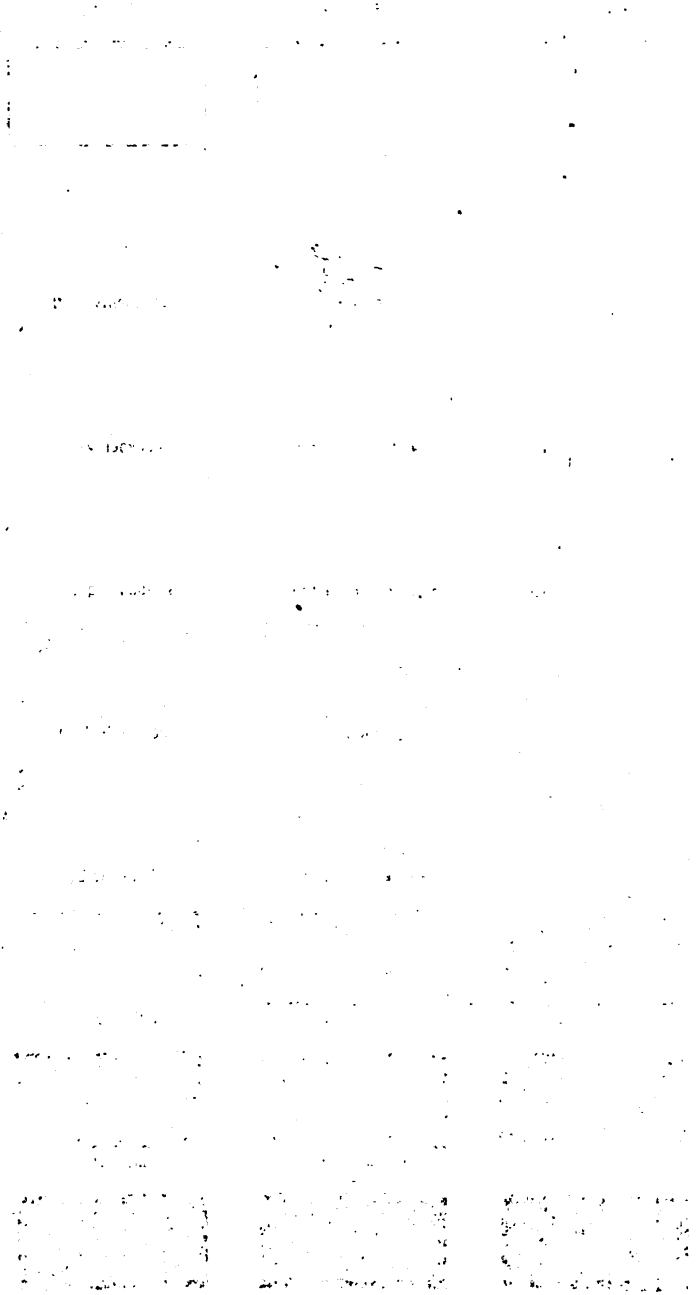

53*. V-B.
55*. B-V.
57*. VB-V.
f
Pallid Grayish Violet-Blue
Pale Campanula Blue
Light Chicory Blue
d
Pale Grayish Violet-Blue
Light Campanula Blue
Chicory Blue
b
Light Grayish Violet-Blue
*Campanula Blue
Deep Chicory Blue
Dull Violet-Blue
Dull Blue-Violet (1)
Dull Bluish Violet (1)
i
Grayish Violet-Blue
Grayish Blue-Violet (1)
Deep Dull Bluish Violet (1)
k
Dark Dull Violet-Blue
Dark Grayish Blue-Violet
Dark Dull Bluish Violet (1)
m
Urania Blue
Dusky Blue-Violet (2)
*Plum' Purple



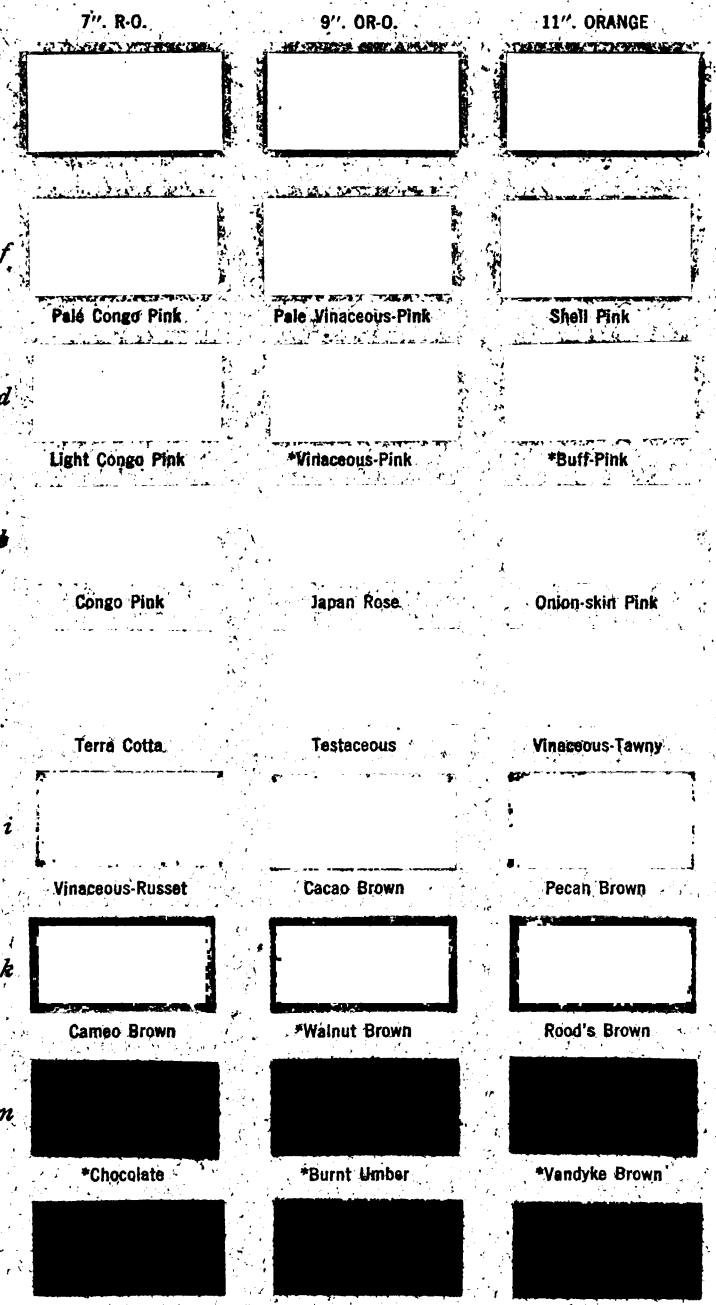

61'. VR-V.
63'. R-V.
65'. RR-V.
f
Pale Lavender-Violet
Pale Mauve
Mauvette
d
Light Lavender-Violet
Light Mauve
Lilac
b
Lavender-Violet
*Mauve
Chinese Violet
Pleroma Violet
Manganese Violet
Mathews' Purple
i
Haematoxylin Violet
Litho Purple
Petunia Violet
k
Anthracene Violet
Madder Violet
Nigrosin Violet
m
Dark Anthracene Violet
Dark Madder Violet
Dark Nigrosin Violet

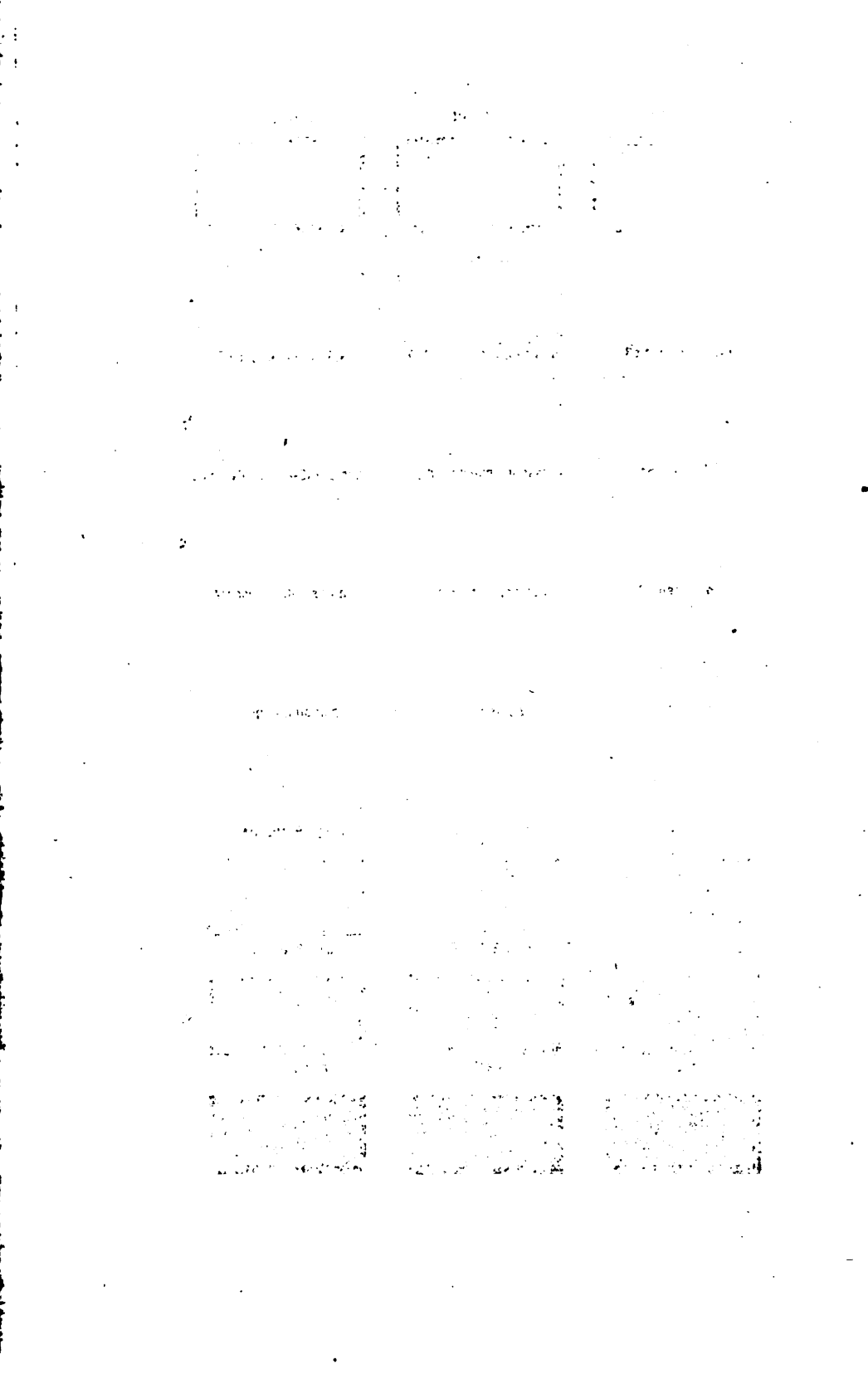


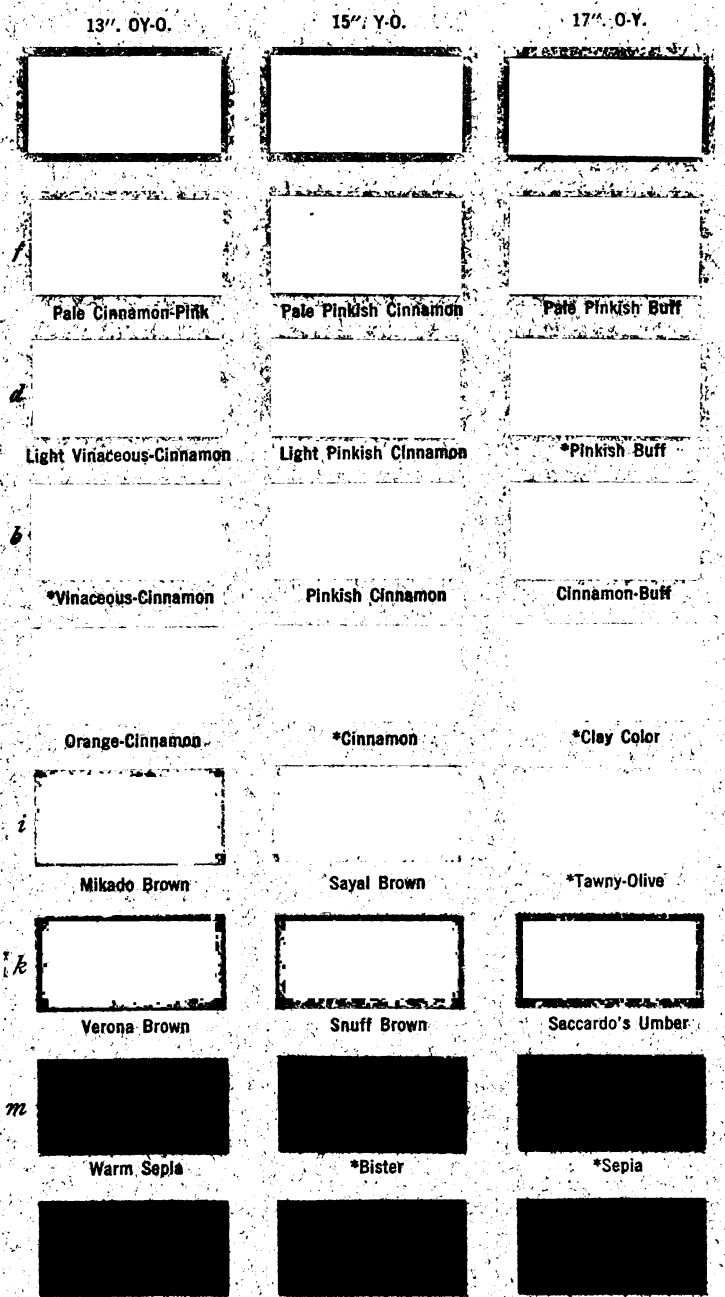

67′. V-R.
69′. RV-R.
71′. V-RR.
f
Pale Rose-Purple
Rosolane Pink
Cameo Pink
d
*Rose-Purple
Pale Rosolane Purple
Thulite Pink
b
Liseran Purple
Light Rosolane Purple
Spinel Pink
*Magenta
Rosolane Purple
Spinel Red
i
Dull Magenta Purple
Schœnfeld's Purple
Indian Lake
k
Dull Dark Purple
*Auricula Purple
Dahlia Carmine
m
Dull Dusky Purple
Dusky Auricula Purple
Dark Maroon-Purple

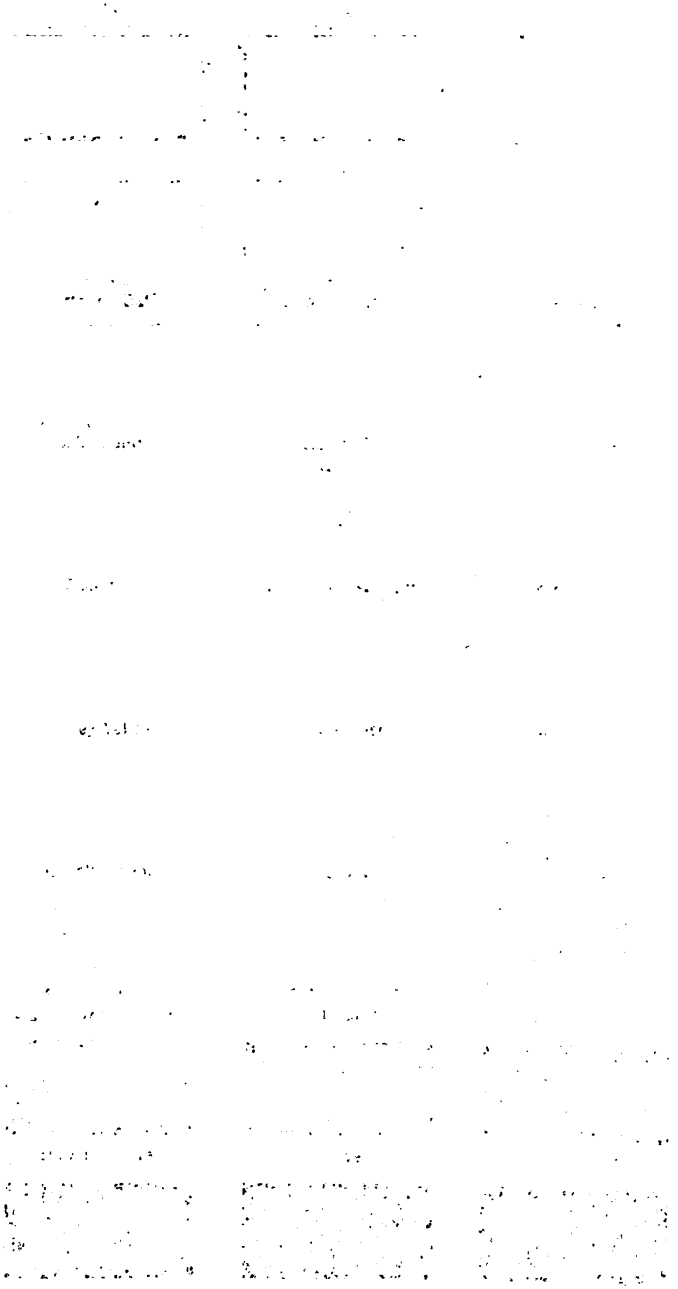


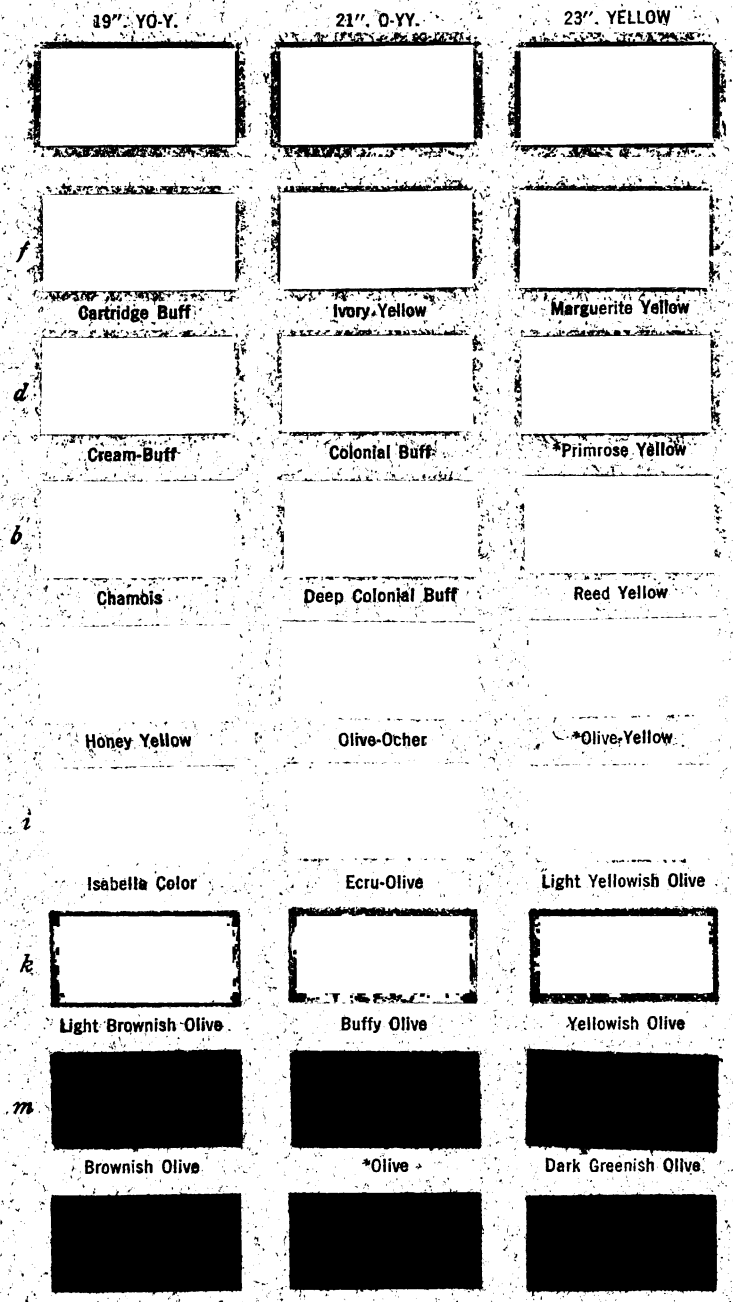

1". RED.
3". O-R.
5". OO-R.
f
Pale Vinaceous
Livid Pink
Hydrangea Pink
d
*Vinaceous
Corinthian Pink
Pinkish Vinaceous
b
Deep Vinaceous
Light Corinthian Red
Orange-Vinaceous
Dark Vinaceous
Corinthian Red
Etruscan Red
i
Hydrangea Red
Deep Corinthian Red
Ocher Red
k
Mineral Red
Indian Red
Prussian Red
m
Dark Mineral Red
Dark Indian Red
Hæmatite Red

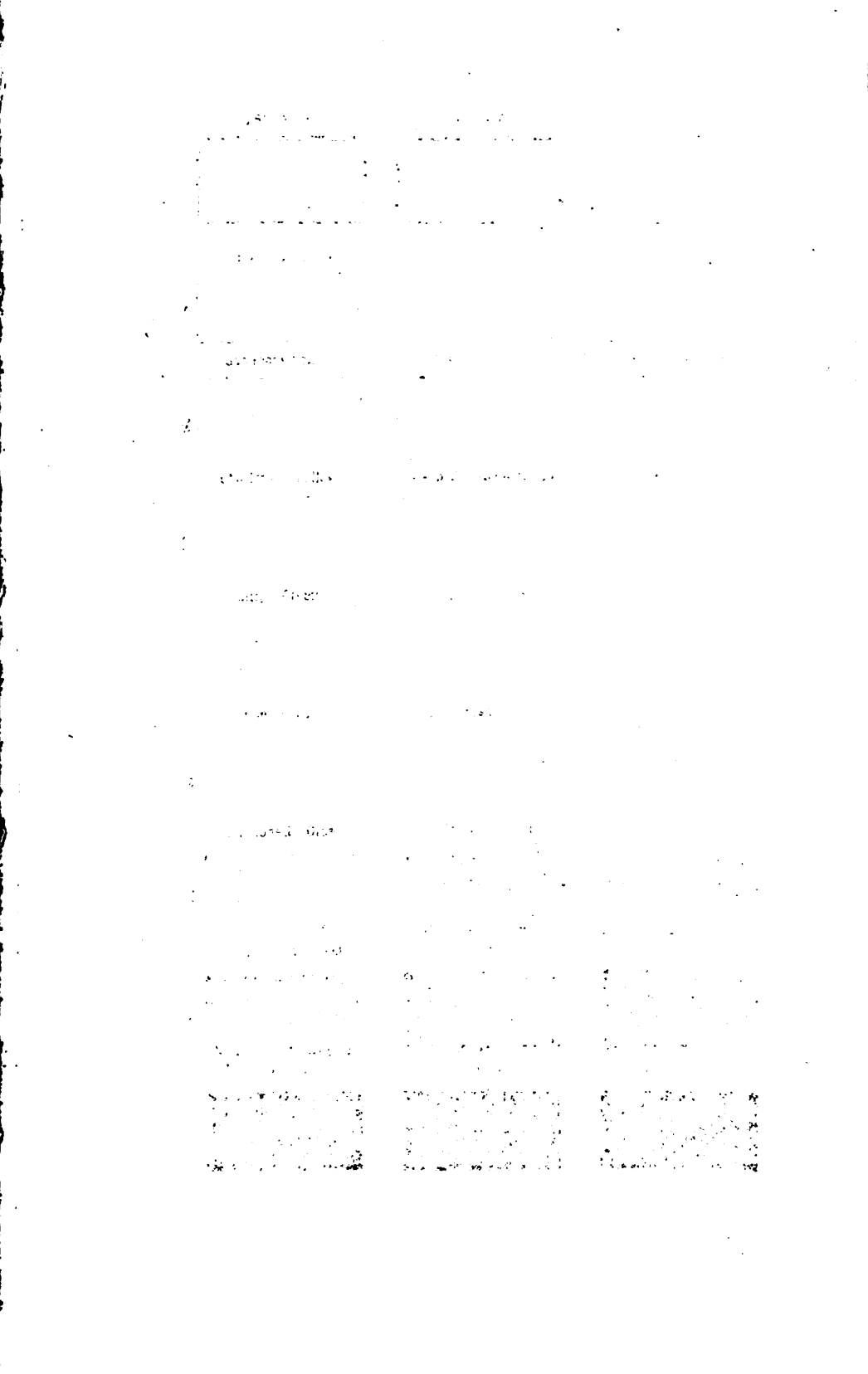

7". R-O.
9". OR-O.
11". ORANGE
f
Pale Congo Pink
Pale Vinaceous-Pink
Shell Pink
d
Light Congo Pink
*Vinaceous-Pink
*Buff-Pink
b
Congo Pink
Japan Rose
Onion-skin Pink
Terra Cotta
Testaceous
Vinaceous-Tawny
i
Vinaceous-Russet
Cacao Brown
Pecan Brown
k
Cameo Brown
*Walnut Brown
Rood's Brown
m
*Chocolate
*Burnt Umber
*Vandyke Brown

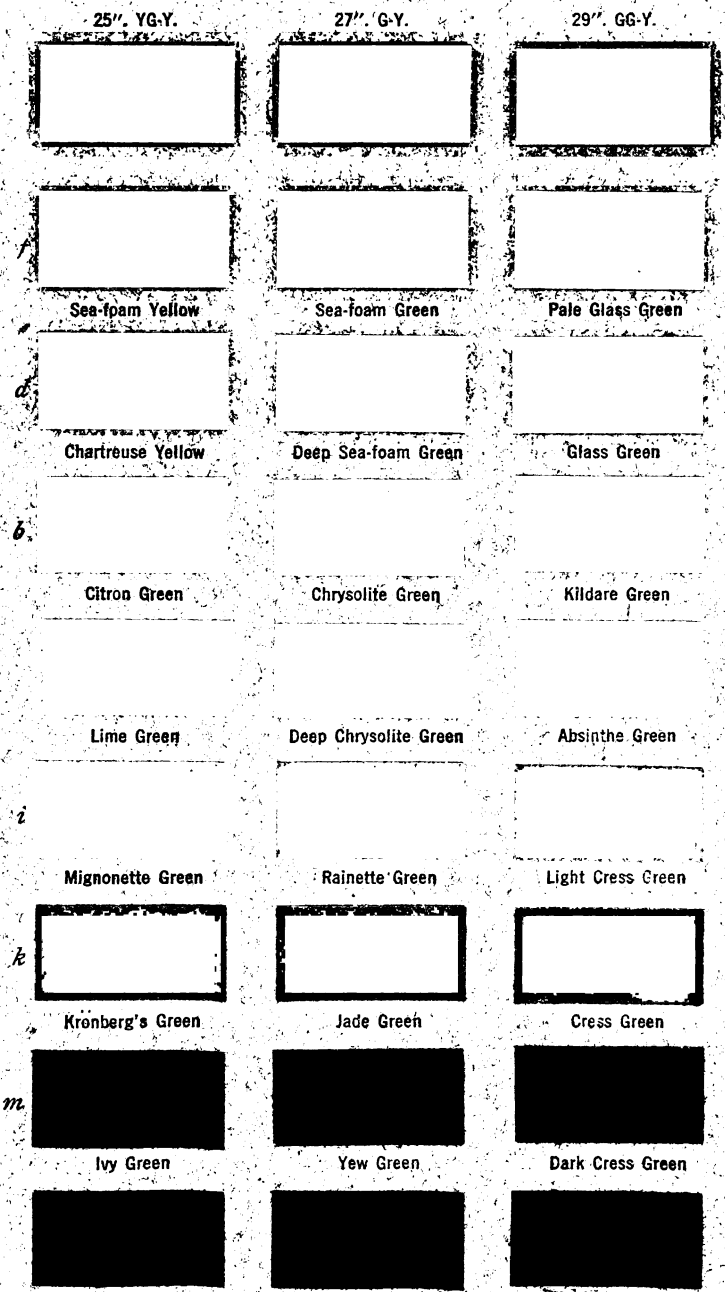


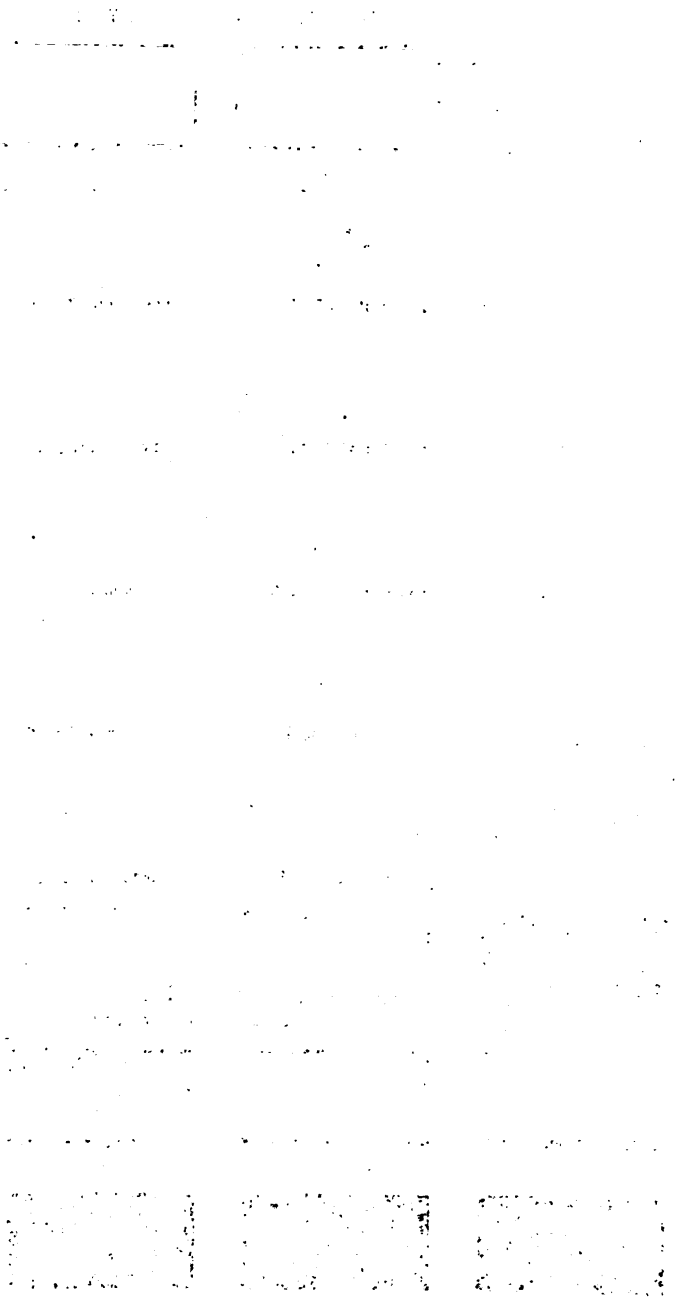

13″. OY-O.
15″. Y-O.
17″. O-Y.
f
Pale Cinnamon-Pink
Pale Pinkish Cinnamon
Pale Pinkish Buff
d
Light Vinaceous-Cinnamon
Light Pinkish Cinnamon
*Pinkish Buff
b
*Vinaceous-Cinnamon
Pinkish Cinnamon
Cinnamon-Buff
Orange-Cinnamon
*Cinnamon
*Clay Color
i
Mikado Brown
Sayal Brown
*Tawny-Olive
k
Verona Brown
Snuff Brown
Saccardo's Umber
m
Warm Sepia
*Bister
*Sepia

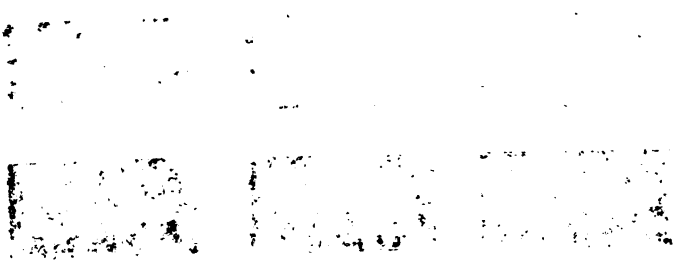


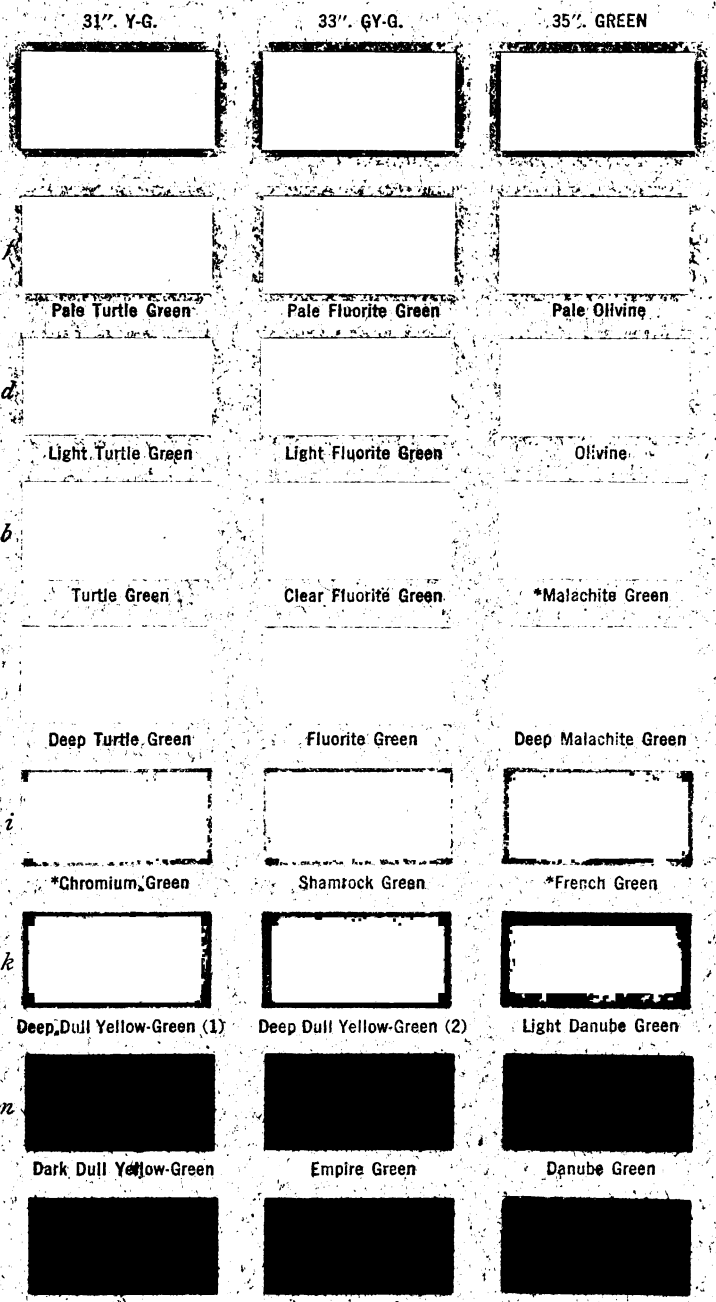

19″. YO-Y.
21″. O-YY.
23″. YELLOW
f
Cartridge Buff
Ivory Yellow
Marguerite Yellow
d
Cream-Buff
Colonial Buff
*Primrose Yellow
b
Chamois
Deep Colonial Buff
Reed Yellow
Honey Yellow
Olive-Ocher
*Olive-Yellow
i
Isabella Color
Ecru-Olive
Light Yellowish Olive
k
Light Brownish Olive
Buffy Olive
Yellowish Olive
m
Brownish Olive
*Olive
Dark Greenish Olive



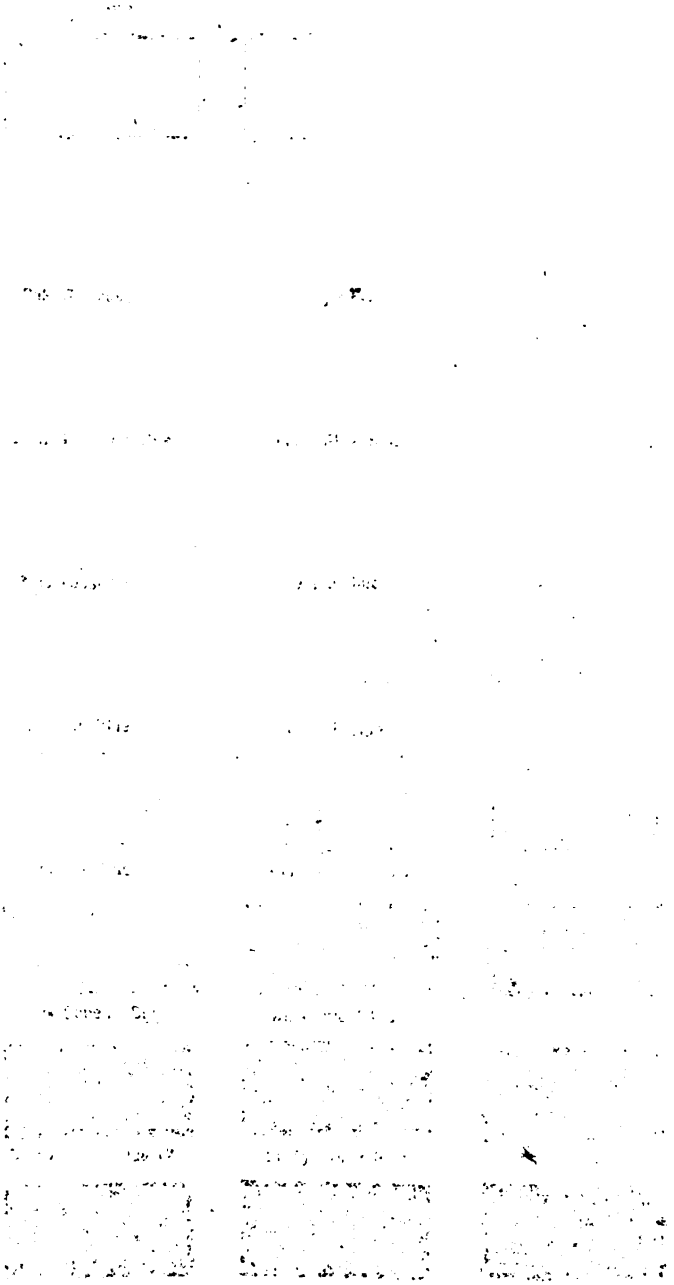

25°. YG-Y.
27°. G-Y.
29°. GG-Y.
f
Sea-foam Yellow
Sea-foam Green
Pale Glass Green
d
Chartreuse Yellow
Deep Sea-foam Green
Glass Green
b
Citron Green
Chrysolite Green
Kildare Green
Lime Green
Deep Chrysolite Green
Absinthe Green
i
Mignonette Green
Rainette Green
Light Cress Green
k
Kronberg's Green
Jade Green
Cress Green
m
Ivy Green
Yew Green
Dark Cress Green

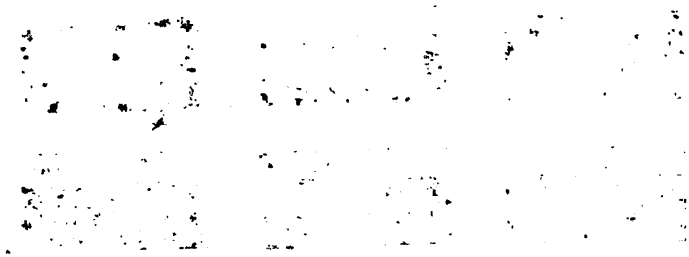




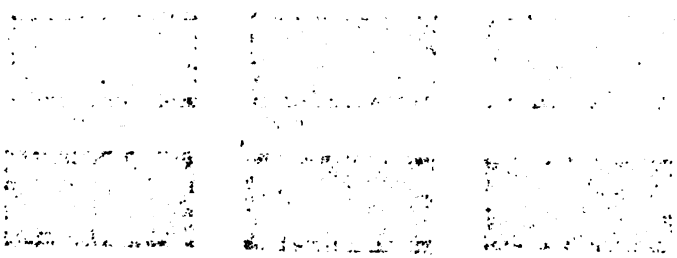

31″. Y-G.
33″. GY-G.
35″. GREEN
f
Pale Turtle Green
Pale Fluorite Green
Pale Olivine
d
Light Turtle Green
Light Fluorite Green
Olivine
b
Turtle Green
Clear Fluorite Green
*Malachite Green
Deep Turtle Green
Fluorite Green
Deep Malachite Green
i
*Chromium Green
Shamrock Green
*French Green
k
Deep Dull Yellow-Green (1)
Deep Dull Yellow-Green (2)
Light Danube Green
m
Dark Dull Yellow-Green
Empire Green
Danube Green


37°. GB-G.
39°. B-G.
41°. BB-G.
f
Lichen Green
Pale Glaucous-Green
Pale Niagara Green
d
Deep Lichen Green
*Glaucous-Green
Light Niagara Green
b
Reseda Green
Deep Glaucous-Green
Niagara Green
Montpellier Green
Light Porcelain Green
Light Terre Verte
i
Jasper Green
Porcelain Green
*Terre Verte
k
Nickel Green
Dark Porcelain Green
Dark Terre Verte
m
Dusky Green
Dusky Blue-Green
Dusky Bluish Green





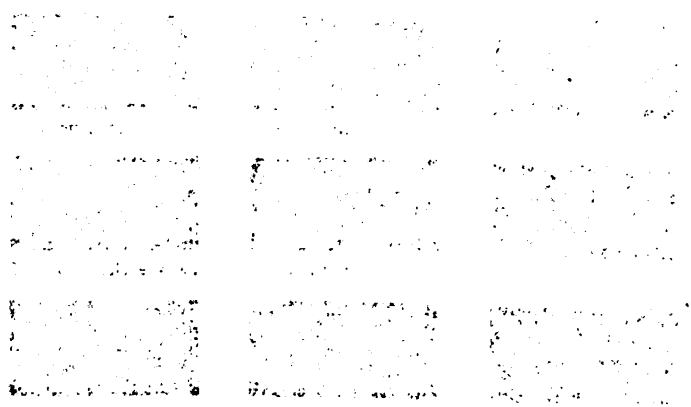

43″, G-B.
45″, BG-B.
47″, G-BB.
f
Pale Glaucous-Blue
Sky Gray.
Burn Blue
d
Light Glaucous-Blue
Light Alice Blue
Light Columbia Blue
b
*Glaucous-Blue
Alice Blue
Columbia Blue
Porcelain Blue
Orient Blue
Light Tyrian Blue
i
Gobelin Blue
Deep Orient Blue
Tyrian Blue
k
Dark Gobelin Blue
Dark Orient Blue
Dark Tyrian Blue
m
Dusky Green Blue (2)
Dusky Orient Blue
*Indigo Blue



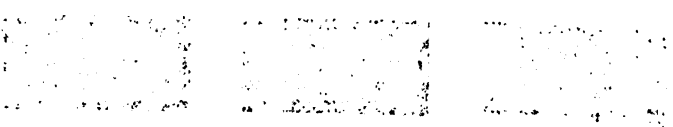
	49″. BLUE	51″. BV-B.	53″. V-B.
f	*Pearl Blue	Pale Grayish Blue-Violet	Pale Aniline Lilac
d	Pale Windsor Blue	Light Grayish Blue-Violet	Aniline Lilac
b	Light Windsor Blue	Grayish Blue-Violet (2)	Deep Aniline Lilac
	Clear Windsor Blue	Dull Bluish Violet (2)	Dull Violet-Blue
i	Windsor Blue	Deep Dull Bluish Violet (2)	Deep Dull Violet-Blue
k	Acetin Blue	Dark Dull Bluish Violet (2)	Dark Dull Violet-Blue
m	Nigrosin Blue	Diamin-Azo Blue	Dusky Dull Violet-Blue

	55″. B-V.	57″. VB-V.	59″. VIOLET
f	Pale Verbena Violet	Pale Bluish Lavender	*Lavender
d	Verbena Violet	Bluish Lavender	Deep Lavender
b	Ontario Violet	Light Dull Bluish Violet	Light Hyssop Violet
	Vanderpoel's Violet	Dull Bluish Violet (3)	Hyssop Violet
i	Dull Blue-Violet (2)	Deep Dull Bluish Violet (3)	Deep Hyssop Violet
k	Yvette Violet	Dark Dull Bluish Violet (3)	Dark Hyssop Violet
m	Dark Yvette Violet	Dusky Dull Violet (1)	Dusky Dull Violet (2)

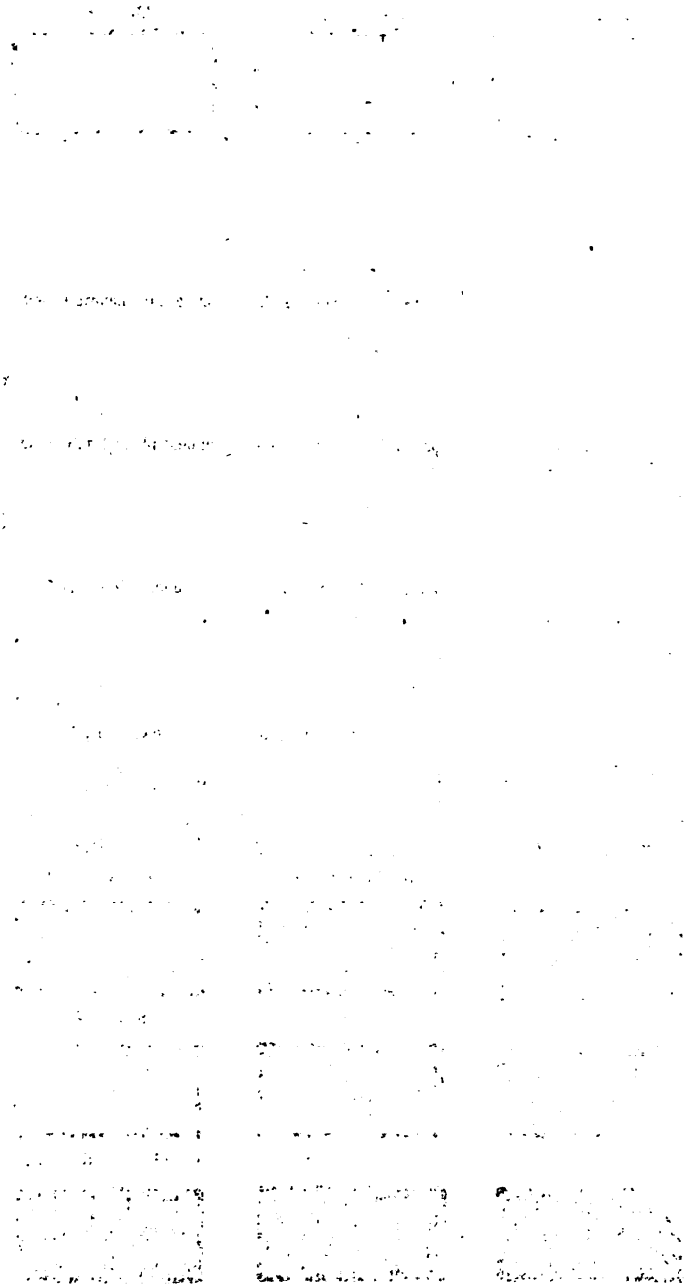

ISLE
OF
WIGHT



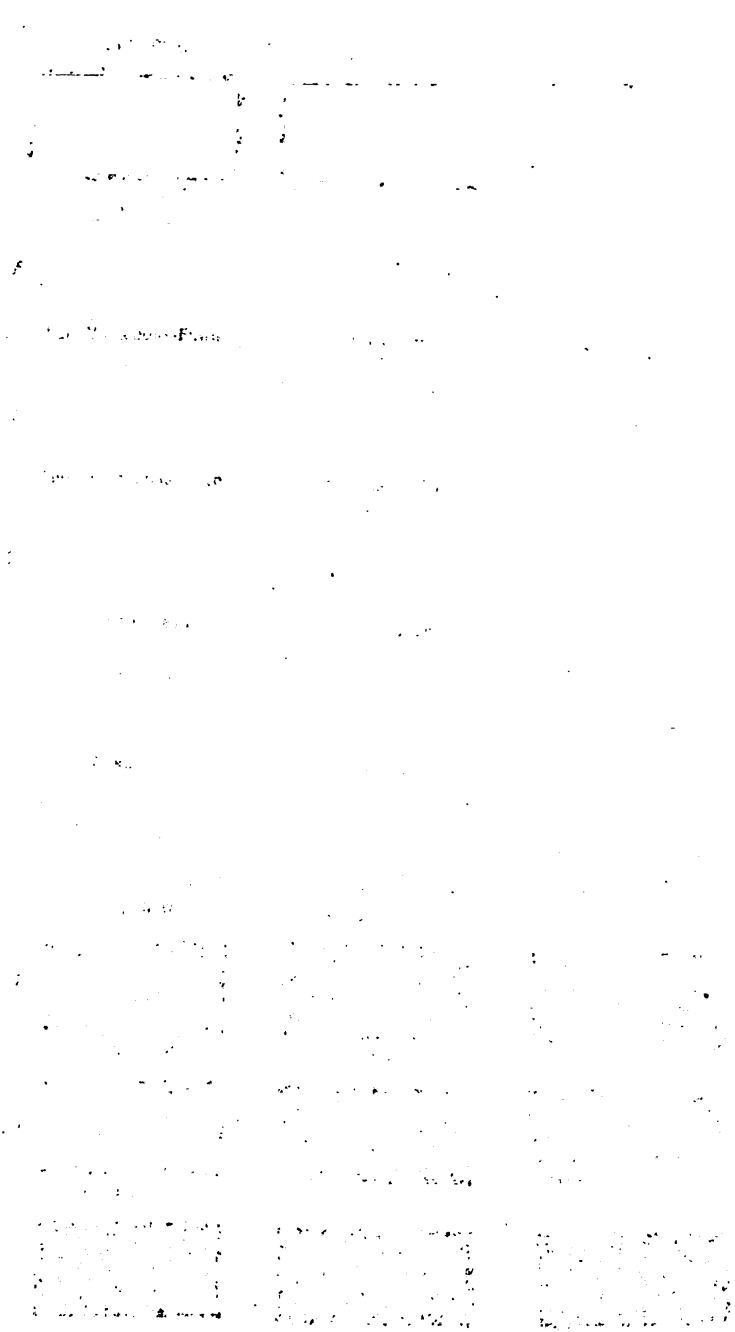
	61″. VR-V.	63″. R-V.	65″. RR-V.
f	Pale Lobelia Violet	Pale Lilac	Light Pinkish Lilac
d	Light Lobelia Violet	Hay's Lilac	Purplish Lilac
b	Lobelia Violet	Ageratum Violet	Argyle Purple
	Saccardo's Violet	Aconite Violet	Bishop's Purple
i	Livid Violet	Livid Purple	Light Perilla Purple
k	Naphthalene Violet	Deep Livid Purple	Perilla Purple
m	Dark Naphthalene Violet	Dark Livid Purple	Dark Perilla Purple



	67″. V-R.	69″. RV-R.	71″. V-RR.
f	Pale Laelia Pink	Pale Persian Lilac	Pale Rhodonite Pink
d	Laelia Pink	Persian Lilac	Rhodonite Pink
b	Tourmaline Pink	Daphne Pink	Rocellin Purple
	Eupatorium Purple	Daphne Red	Hellebore Red
i	Vinaceous-Purple	Vernonia Purple	Deep Hellebore Red
k	Dark Vinaceous-Purple	Corinthian Purple	Neutral Red
m	*Indian Purple	Dark Corinthian Purple	Mars Violet

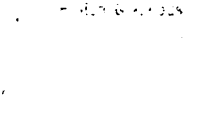


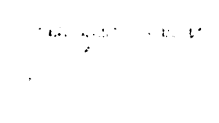
	1‴. RED	5‴. OO-R.	9‴. OR-O.
f	Pale Purplish Vinaceous	Pale Brownish Vinaceous	Pale Grayish Vinaceous
d	Light Purplish Vinaceous	Light Brownish Vinaceous	Light Grayish Vinaceous
b	Purplish Vinaceous	Brownish Vinaceous	Light Russet-Vinaceous
	Livid Brown	Deep Brownish Vinaceous	Russet-Vinaceous
i	Deep Livid Brown	Vinaceous-Brown	Sorghum Brown
k	Dark Livid Brown	Dark Vinaceous-Brown	Hay's Brown
m	Warm Blackish Brown	*Seal Brown	Light Seal Brown

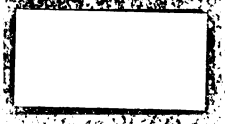
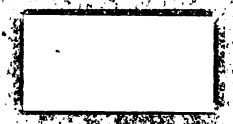
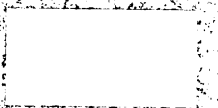
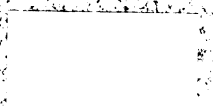
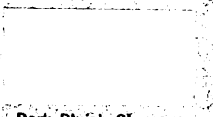
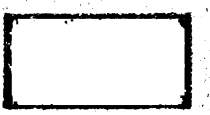
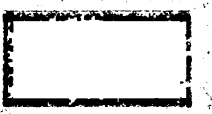


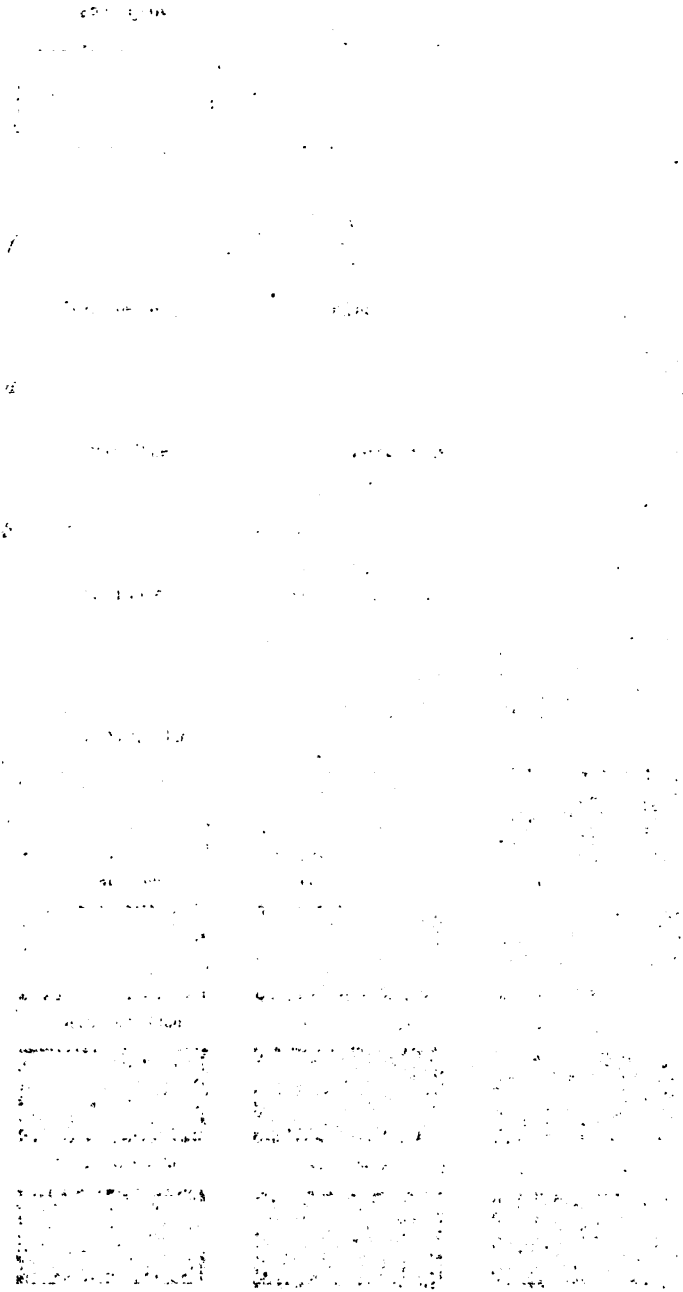

13''' OY-O.
17''' O-Y.
21''' O-YY.
f
Pale Vinaceous-Fawn
Tilleul-Buff
Pale Olive-Buff
d
Light Vinaceous-Fawn
*Vinaceous-Buff
*Olive-Buff
b
Vinaceous-Fawn
Avellaneous
Deep Olive-Buff
*Fawn Color
*Wood Brown
Dark Olive-Buff
i
Army Brown
Buffy Brown
Citrine-Drab
k
Natal Brown
Olive-Brown
Deep Olive
m
Bone Brown
*Clove Brown
Dark Olive

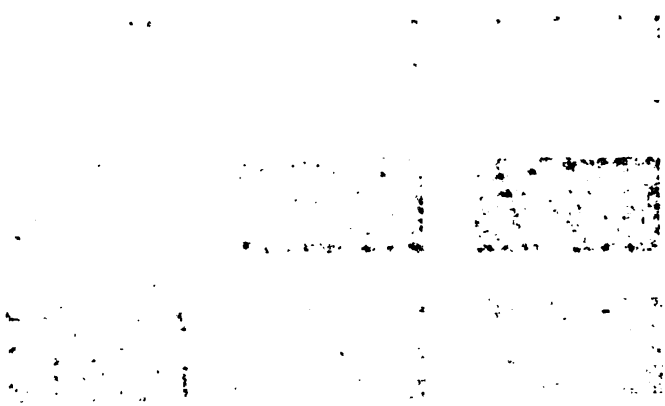
	25°. YG-Y.	29°. GG-Y.	33°. GY-G.
f	Yellowish Glaucous	Glaucous	Greenish Glaucous
d	Water Green	Corydalis Green	Deep Greenish Glaucous
b	Light Grape Green	Mytho Green	Dark Greenish Glaucous
	Grape Green	Asphodel Green	Pistachio Green
i	Deep Grape Green	Pois Green	American Green
k	Lincoln Green	Leaf Green	Dark American Green
m	Dusky Olive-Green	Dusky Yellowish Green	Dull Blackish Green



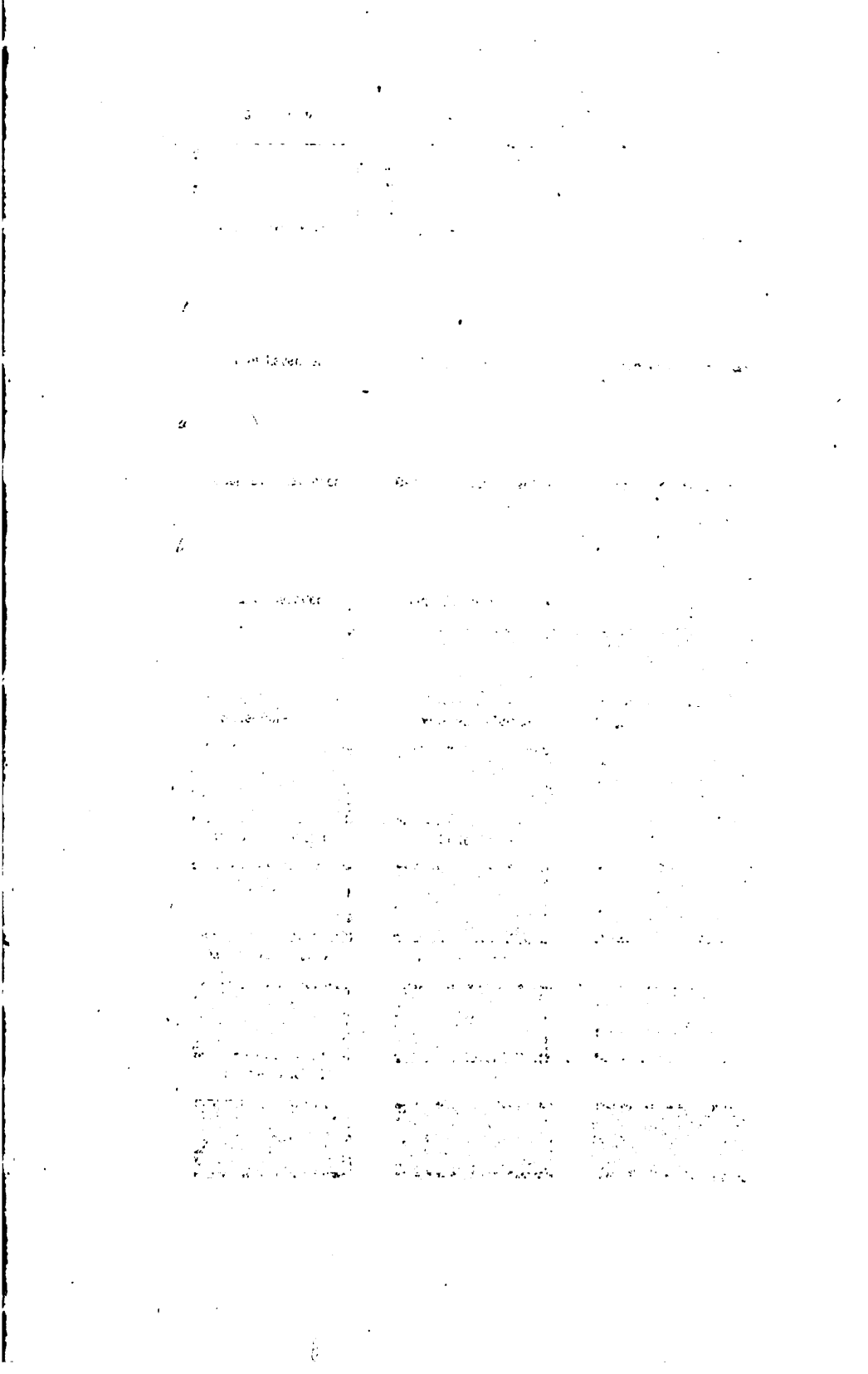


	37‴. GB-G.	41‴. BB-G.	45‴. BG-B.
			
f			
	Bluish Glaucous	Pale Dull Glaucous-Blue	Pale Russian Blue
d			
	Deep Bluish Glaucous	Light Dull Glaucous-Blue	Russian Blue
b			
	Dark Bluish Glaucous	Greenish Glaucous-Blue	Cadet Gray
			
	Stone Green	Bluish Gray-Green	Perula Blue
i			
	Russian Green	Deep Bluish Gray-Green	Delft Blue
k			
	Dark Russian Green	Dark Bluish Gray-Green	Deep Delft Blue
m			
	Dusky Dull Green	Dusky Dull Bluish Green	Dark Delft Blue
			

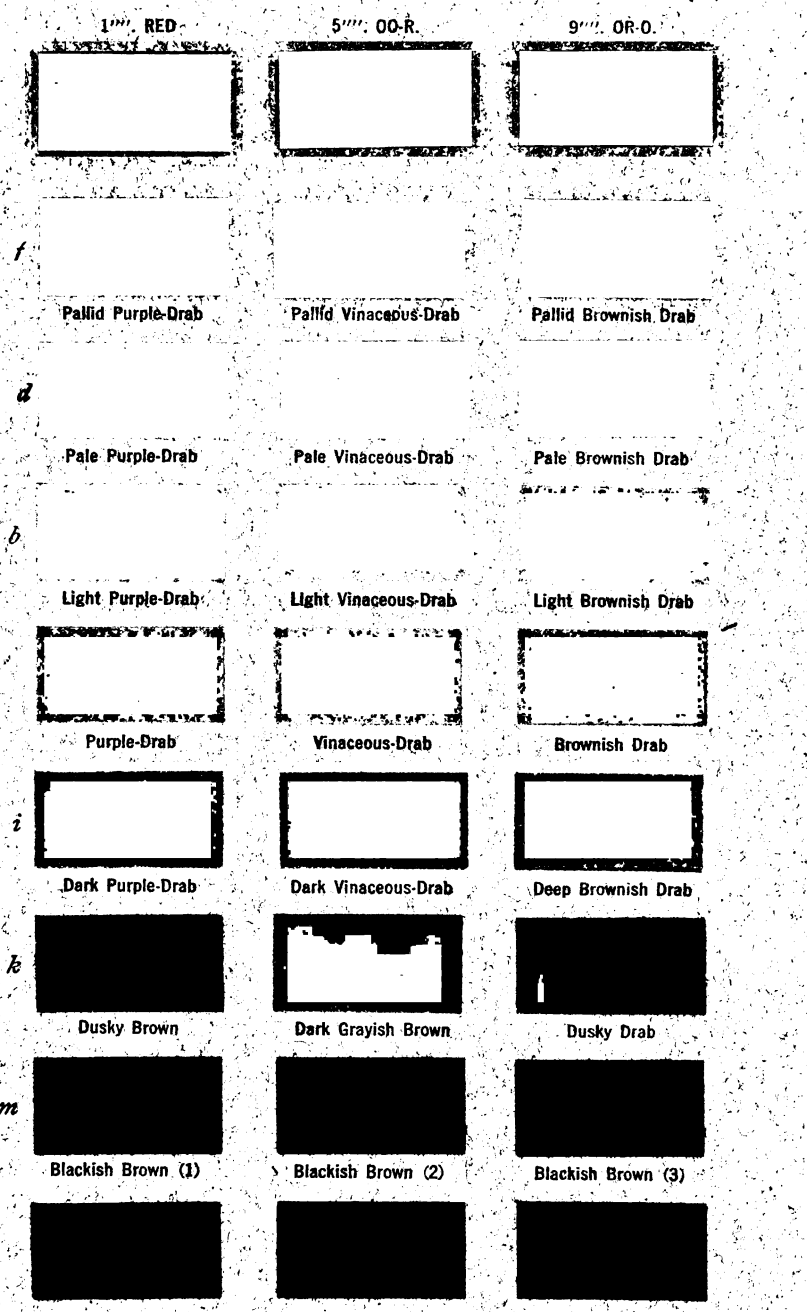




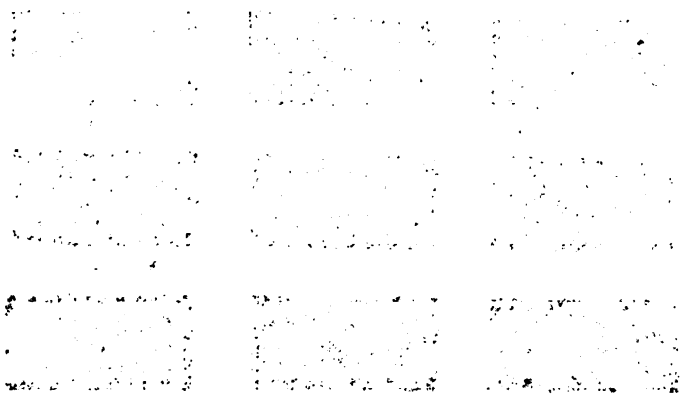
	49‴. BLUE	53‴. V-B.	57‴. VB-V.
f	*Lavender Gray	Plumbago Blue	Grayish Lavender
d	Endive Blue	Deep Plumbago Blue	Deep Grayish Lavender
b	Dutch Blue	Dark Plumbago Blue	Dark Grayish Lavender
	Deep Dutch Blue	Madder Blue	Ramier Blue
i	Slate-Blue	Deep Madder Blue	Slate-Violet (1)
k	Deep Slate-Blue	Dark Madder Blue	Dark Slate-Violet (1)
m	Dusky Slate-Blue	Dusky Violet-Blue (2)	Dusky Slate-Violet



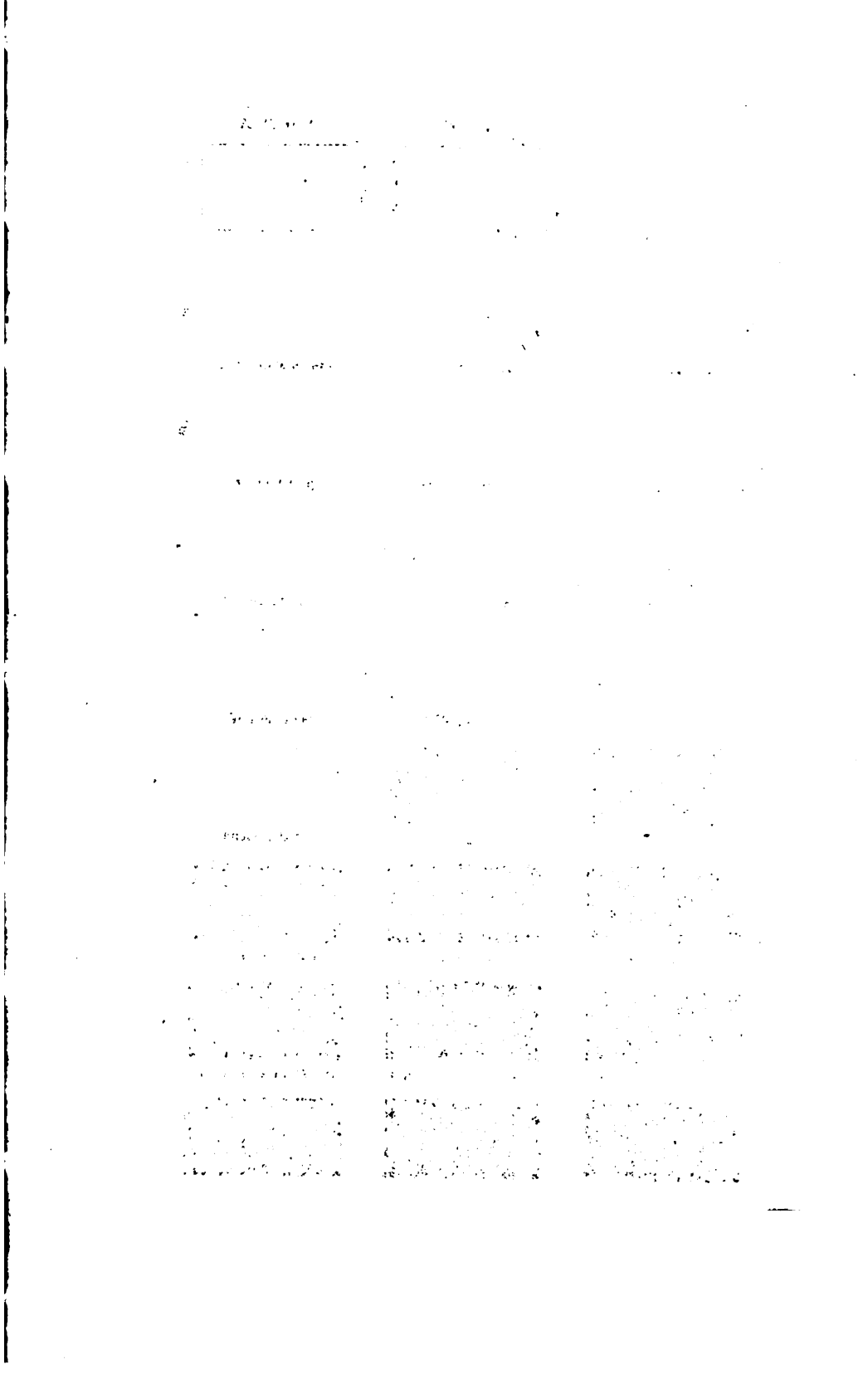
	61‴. VR-V.	65‴. RR-V.	69‴. RV-R.
f	Dull Lavender	Vinaceous-Lavender	Pale Vinaceous-Lilac
d	Deep Dull Lavender	Deep Vinaceous-Lavender	Light Vinaceous-Lilac
b	Dark Lavender	Light Vinaceous-Purple	Vinaceous-Lilac
	Slate-Violet (2)	Vinaceous-Purple	Deep Purplish Vinaceous
i	Deep Slate-Violet	Slate-Purple	Dull Indian Purple
k	Dark Slate-Violet (2)	Dark Slate-Purple	Anthracene Purple
m	Dull Violet-Black (1)	Raisin Black	Taupe Brown

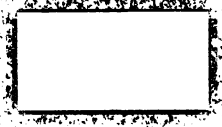
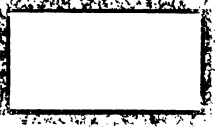
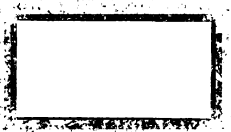
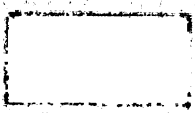
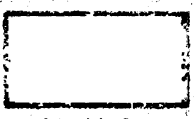
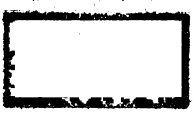
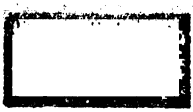
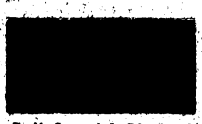

1''''. RED
5''''. OO-R.
9''''. OR-O.
f
Pallid Purple-Drab
Pallid Vinaceous-Drab
Pallid Brownish Drab
d
Pale Purple-Drab
Pale Vinaceous-Drab
Pale Brownish Drab
b
Light Purple-Drab
Light Vinaceous-Drab
Light Brownish Drab
Purple-Drab
Vinaceous-Drab
Brownish Drab
i
Dark Purple-Drab
Dark Vinaceous-Drab
Deep Brownish Drab
k
Dusky Brown
Dark Grayish Brown
Dusky Drab
m
Blackish Brown (1)
Blackish Brown (2)
Blackish Brown (3)

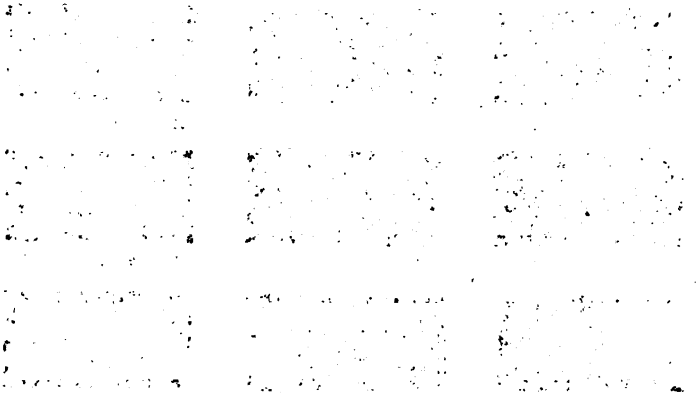

BANK OF ENGLAND

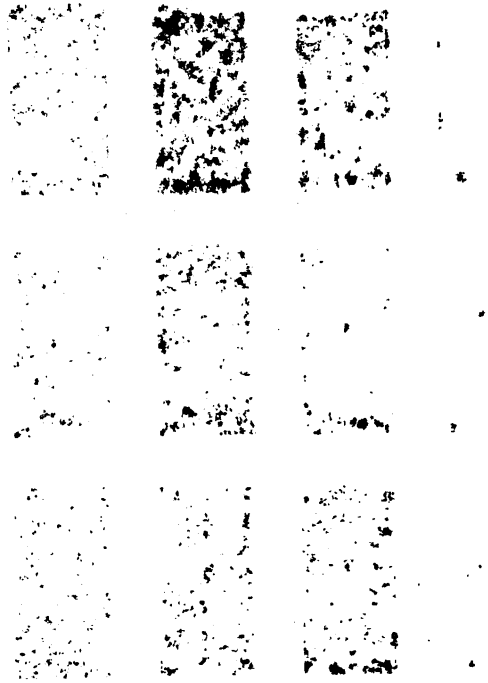



13ᵐᵐ. OY-O.
17ᵐᵐ. O-Y.
21ᵐᵐ. O-YY.
f
Pale Ecru-Drab
Pale Drab-Gray
Pale Smoke Gray
d
*Ecru-Drab
*Drab-Gray
*Smoke Gray
b
Light Cinnamon-Drab
Light Drab
Light Grayish Olive
Cinnamon-Drab
*Drab
Grayish Olive
i
Benzo Brown
*Hair Brown
Deep Grayish Olive
k
Fuscous
Chaetura Drab
Dark Grayish Olive
m
Fuscous-Black
Chaetura Black
Olivaceous Black (1)

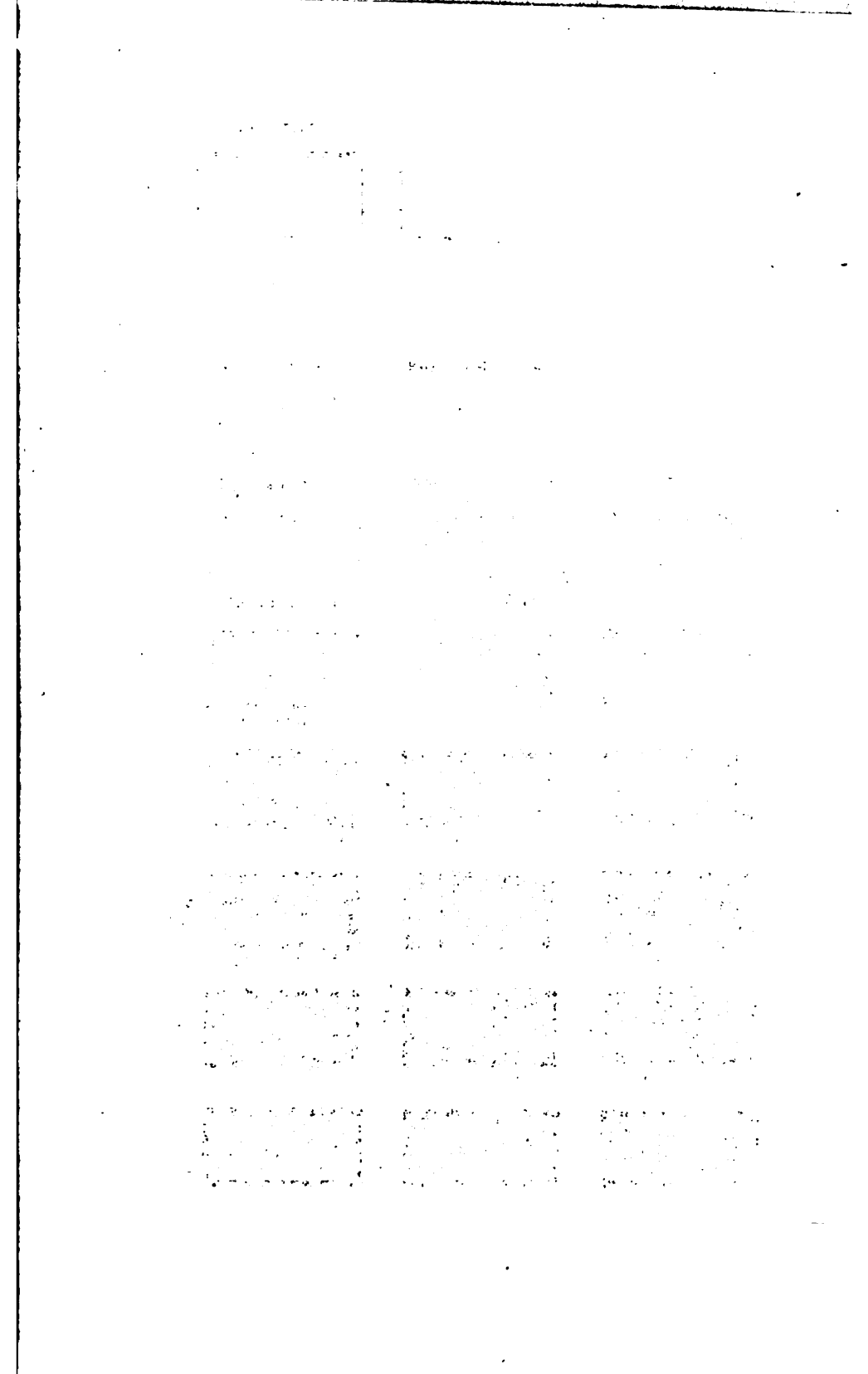


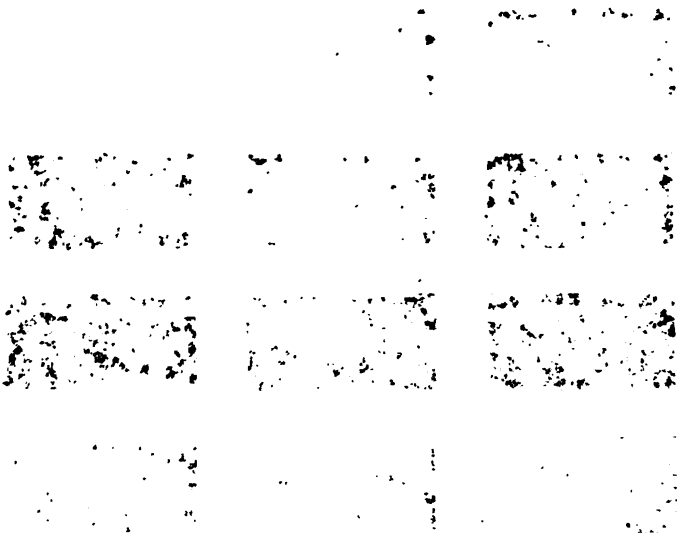
	25″″. YG-Y.	29″″. GG-Y.	33″″. GY-G.
			
f	Light Mineral Gray	Court Gray	Puritan Gray
d	Mineral Gray	Gnaphalium Green	Light Celandine Green
b	Tea Green	*Pea Green	Celandine Green
			
	Vetiver Green	*Sage Green	Artemisia Green
i			
	Andover Green	Slate-Olive	Lily Green
k			
	Dark Ivy Green	Deep Slate-Olive	Deep Slate-Green
m			
	Olivaceous Black (2)	Dull Greenish Black (1)	Dull Greenish Black (2)
			



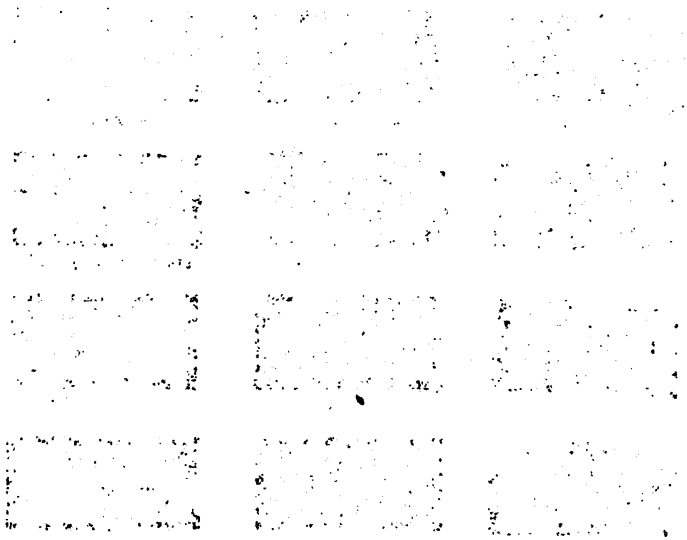


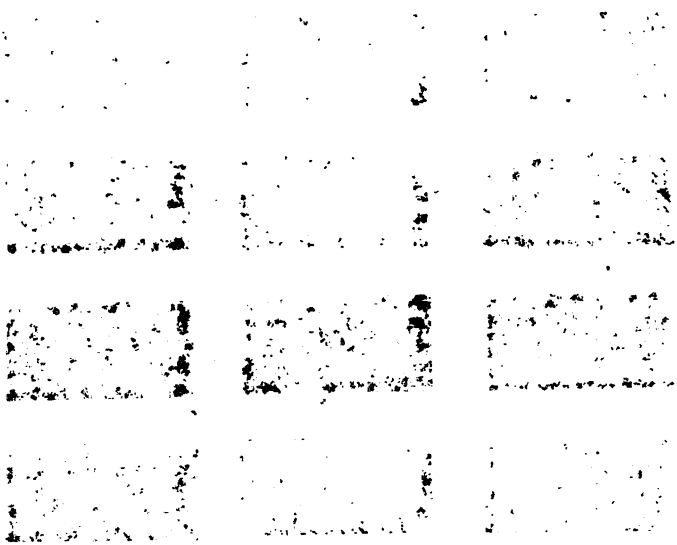
	37′′′. GB-G.	41′′′. BB-G.	45′′′. BG-B.
f	Glaucous-Gray	Pale Medici Blue	Pale Green-Blue Gray
d	Deep Glaucous-Gray	Light Medici Blue	Clear Green-Blue Gray
b	Dark Glaucous-Gray	Medici Blue	Deep Green-Blue Gray
	Grayish Blue-Green	Deep Medici Blue	Dark Green-Blue Gray
i	Deep Grayish Blue-Green	Dark Medici Blue	Green-Blue Slate
k	Dark Grayish Blue-Green	Saccardo's Slate	Dark Green-Blue Slate
m	Greenish Slate-Black	Dull Blue-Green Black	Bluish Slate-Black





	49‴. BLUE	53‴. V-B.	57‴. VB-V.
f	Pale Payne's Gray	Pale Violet-Plumbeous	Rood's Lavender
d	Light Payne's Gray	Light Violet-Plumbeous	Pale Varley's Gray
b	Clear Payne's Gray	Violet-Plumbeous	Light Varley's Gray
	Payne's Gray	Deep Violet-Plumbeous	Varley's Gray
i	Deep Payne's Gray	Violet-Slate	Deep Varley's Gray
k	Dark Payne's Gray	Dark Violet-Slate	Dark Varley's Gray
m	Bluish Black	Dull Violet-Black (2)	Blue-Violet Black





	61′′′. VR-V.	65′′′. RR-V.	69′′′. RV-R.
f	Light Plumbago Gray	Light Heliotrope Gray	Light Vinaceous-Gray
d	Plumbago Gray	Heliotrope Gray	Vinaceous-Gray
b	Deep Plumbago Gray	Deep Heliotrope Gray	Deep Vinaceous-Gray
	Dark Plumbago Gray	Dark Heliotrope Gray	Dark Vinaceous-Gray
i	Plumbago-Slate	Heliotrope-Slate	Vinaceous-Slate
k	Dark Plumbago-Slate	Dark Heliotrope-Slate	Deep Slaty Brown
m	Dull Violet-Black	Dull Purplish Black	Aniline Black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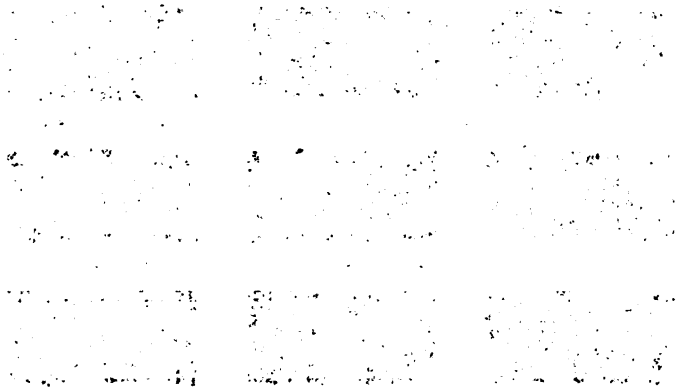
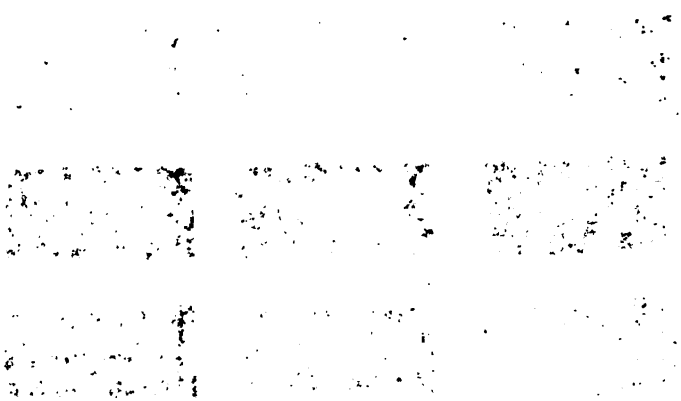
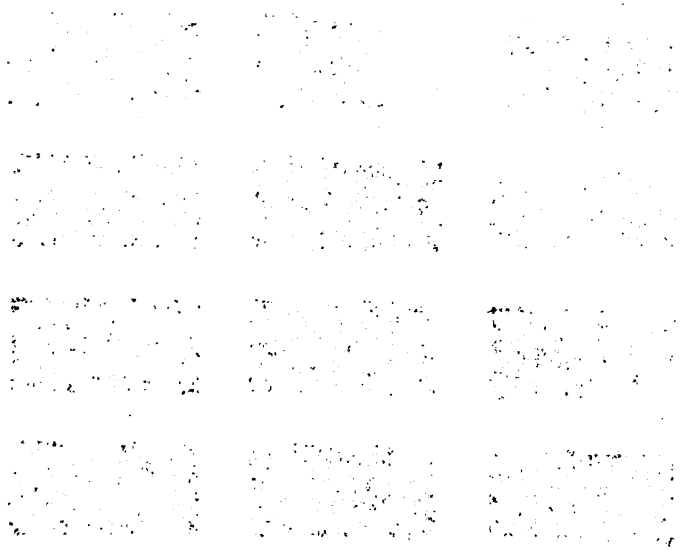
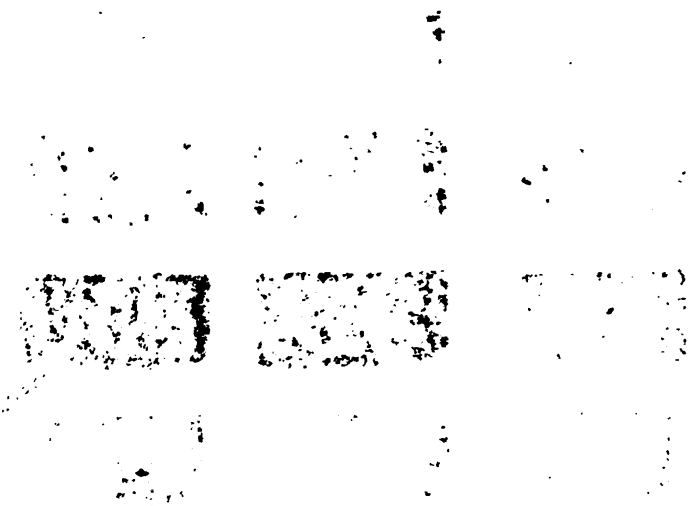
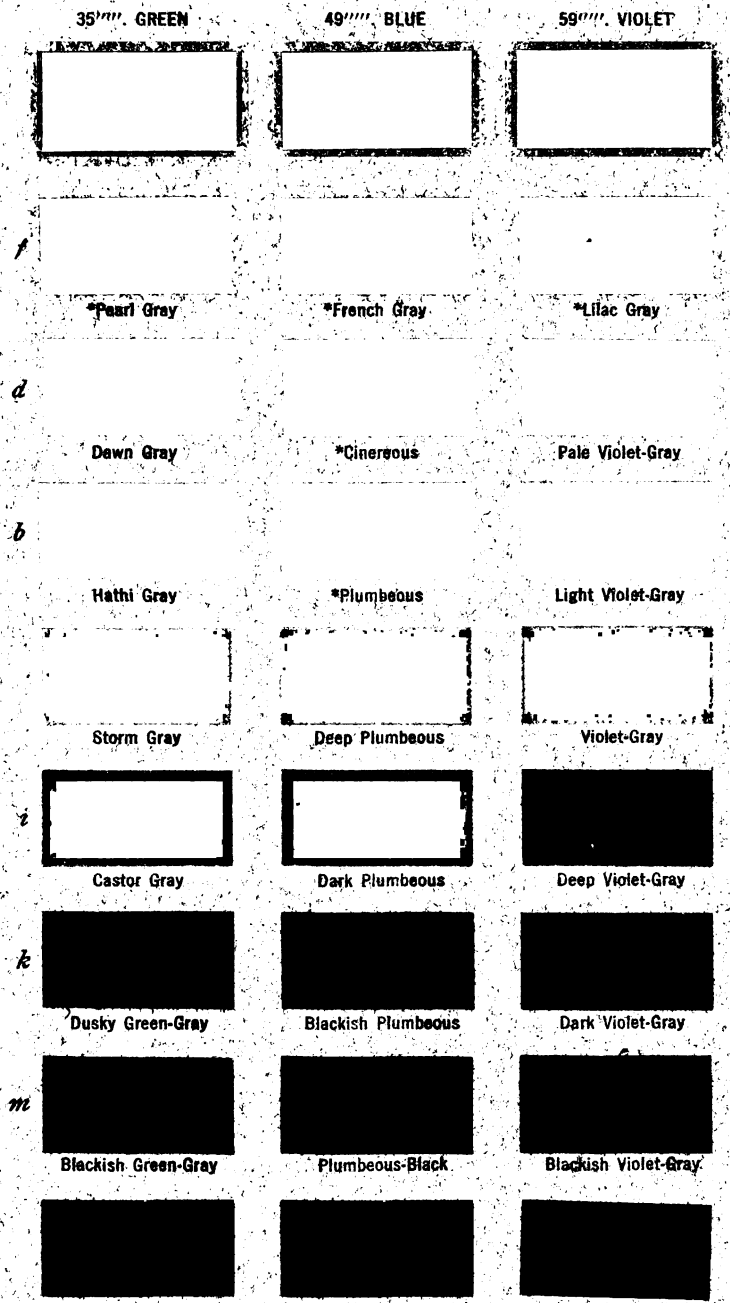




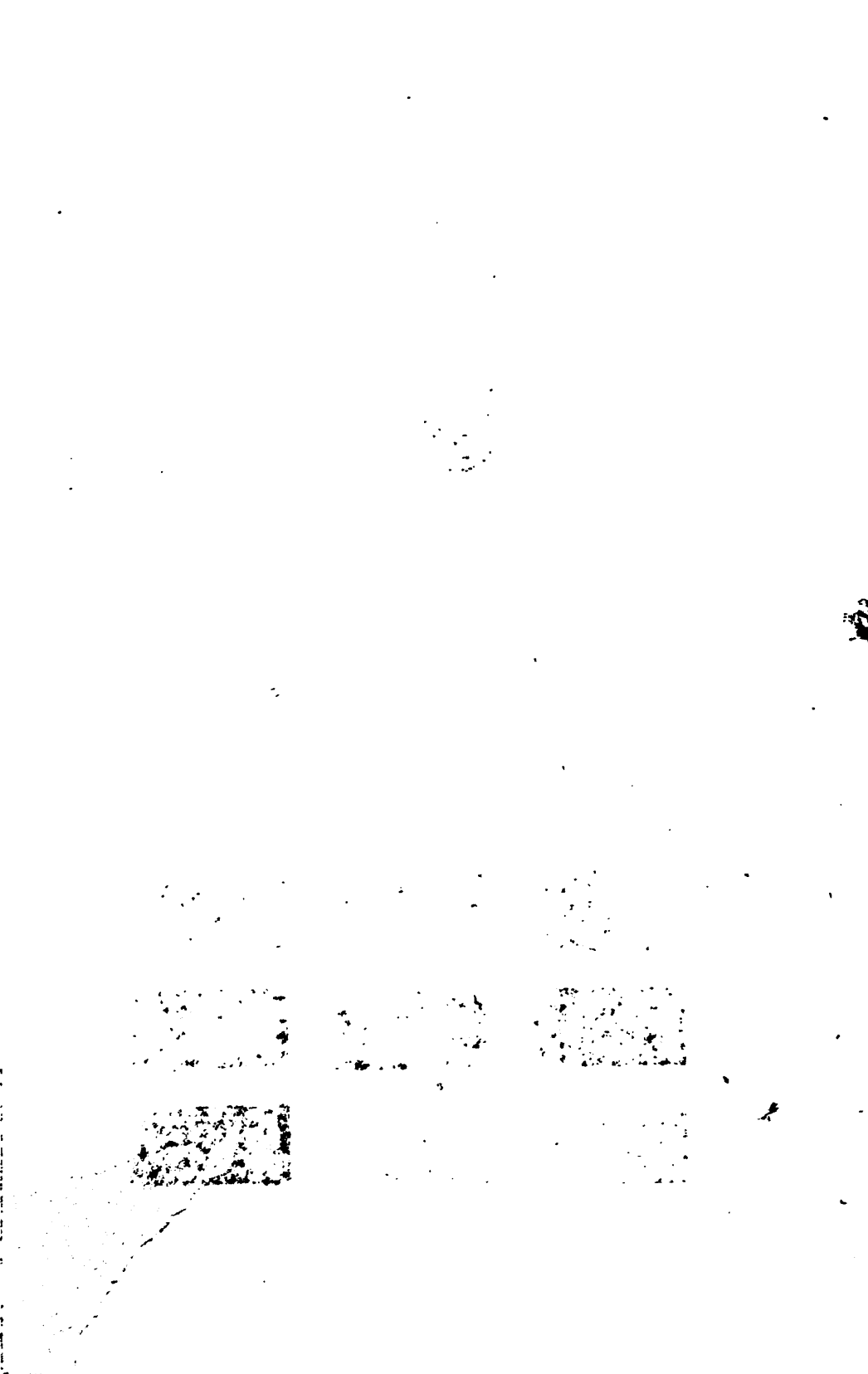
	1″″″. RED	15″″″. Y-O.	23″″″. YELLOW
f	Pallid Quaker Drab	Pallid Mouse Gray	Pale Olive-Gray
d	Pale Quaker Drab	Pale Mouse Gray	Light Olive-Gray
b	Light Quaker Drab	Light Mouse Gray	*Olive-Gray
	Quaker Drab	*Mouse Gray	Deep Olive-Gray
i	Deep Quaker Drab	Deep Mouse Gray	Dark Olive-Gray
k	Dark Quaker Drab	Dark Mouse Gray	Iron Gray
m	Sooty Black	Blackish Mouse Gray	Olivaceous Black (3)






35′″″. GREEN
49″″″. BLUE
59″″″. VIOLET
f
*Pearl Gray
*French Gray
*Lilac Gray
d
Dawn Gray
*Cinereous
Pale Violet-Gray
b
Hatthi Gray
*Plumbeous
Light Violet-Gray
Storm Gray
Deep Plumbeous
Violet-Gray
i
Castor Gray
Dark Plumbeous
Deep Violet-Gray
k
Dusky Green-Gray
Blackish Plumbeous
Dark Violet-Gray
m
Blackish Green-Gray
Plumbeous-Black
Blackish Violet-Gray


Black



	67″″″. V-R.	NEUTRAL GRAY	CARBON GRAY
	White	White	*10. Gray. (Pale Gull Gray)
f	Pallid Purplish Gray	Pallid Neutral Gray	*9. Gray. (Light Gull Gray)
d	Pale Purplish Gray	Pale Neutral Gray	*8. Gray. (Gull Gray)
b	Light Purplish Gray	Light Neutral Gray	*7. Gray. (Deep Gull Gray)
	Purplish Gray	Neutral Gray	*6. Gray. (Dark Gull Gray)
i	Deep Purplish Gray	Deep Neutral Gray	*5. Slate-Gray
k	Dark Purplish Gray	Dark Neutral Gray	*4. Slate Color
m	Dusky Purplish Gray	Dusky Neutral Gray	*3. Blackish Slate
	Black	*1. Black	*2. Slate-Black